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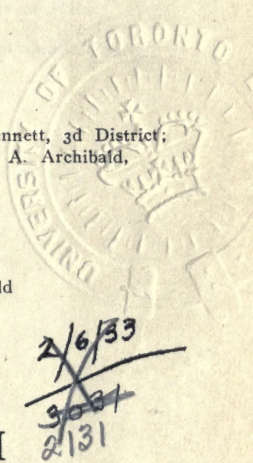
Index to Volume LVII

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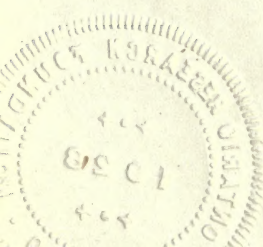
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LIST OF ILLUSTRATIONS

MEMORIAL HALL, COLUMBUS, OHIO, 103.

WHITE OR CALF SCOURS.

- Fig. 1. Calf No. 70 at 88 days, 142.
- Fig. 2. Calf No. 71 at 88 days, 143.
- Fig. 3. Calf No. 71 at 95 days, showing clean preputial tuft, 144.

BACCHARIS PTERONIODES AS A POISONOUS PLANT OF THE SOUTHWEST.

- Fig. 1. *Baccharis pteronioides*, female plant in blossom, 432.
- Fig. 2. *Baccharis pteronioides*, male plant in blossom, 433.

VIEW IN COLUMBUS, OHIO, 495.

NEW VETERINARY BARN AT THE UNIVERSITY OF MINNESOTA.

- Exterior view, 503.
- Interior view, 503.

STRONGYLUS RUBIDUS AS AN ETIOLOGICAL FACTOR IN GASTRIC LESIONS OF HOGS.

- Fig. 1. Croupous membrane on stomach mucosa, 530.
- Fig. 2. Transverse section of worm and eggs in croupous membrane, 530.

OBSERVATIONS ON AMYLOID DEGENERATION IN DOMESTICATED ANIMALS.

- Corpora amylacea, mammary gland, 575.
- Amyloid degeneration, kidney, 575.

QUITTOR TREATMENT AS CARRIED OUT IN A FRENCH MILITARY HOSPITAL.

- French operation for quittor, 601.

PORTRAIT OF C. A. CARY, 631.

LIMBERNECK IN POULTRY.

- Fig. 1. White Plymouth Rock cockerel, 660.
- Fig. 2. White Plymouth Rock cockerel, 660.
- Fig. 3. Rhode Island Red cockerel, 661.
- Fig. 4. Single Comb White Leghorn cockerel, 662.
- Fig. 5. Cross-bred cockerel, 662.
- Fig. 6. Single Comb White Leghorn cockerel, 675.
- Fig. 7. White Plymouth Rock cockerel, 676.
- Fig. 8. White Plymouth Rock cockerel, 677.
- Fig. 9. Single Comb White Leghorn cockerel, 678.

Index of Authors

- Baker, E. T., 314.
 Bandeen, S. G., 46.
 Bemis, H. E., 61.
 Bender, H. E., 463.
 Biester, H. E., 527.
 Bishopp, F. C., 414.
 Broughton, I. B., 322.
 Brill, J. A., 477.
 Bruner, Samuel E., 705.
 Burnett, Samuel Howard, 480.
 Burson, W. M., 295.
 Butler, W. J., 435.
 Carpenter, C. M., 124.
 Cary, C. A., 630.
 Clawson, A. B., 430.
 Crocker, W. J., 527.
 Day, L. Enos, 460.
 Dutcher, R. Adams, 653.
 Eggleston, W. W., 430.
 Fitch, C. P., 518.
 Gallagher, B. A., 692.
 Gilman, Herbert L., 568.
 Giltner, Ward, 46.
 Hagan, W. A., 124.
 Hall, Maurice C., 183, 394, 453, 686.
 Hardenberg, John G., Jr., 282.
 Harkins, M. J., 689.
 Hart, George H., 75, 638.
 Hayes, F. M., 638.
 Hoskins, H. Preston, 317.
 Jorgenson, G. E., 549.
 Kelser, R. A., 282.
 Kiernan, J. A., 439.
 Kigin, L. C., 161.
 King, E. D., Jr., 302.
 Logan, E. A., 525.
 Longley, O. A., 696.
 Lowe, William Herbert, 588.
 Lytle, George A., 165.
 McGinn, H. G., 702.
 McKenna, John F., 593.
 Marsh, C. Dwight, 430.
 Mohler, John R., 579.
 Moore, Veranus A., 543.
 Morgan, O. B., 712.
 Murray, Charles, 539.
 Niles, W. B., 176.
 Orchard, P. J., 147.
 Potter, George M., 152.
 Ransom, Brayton H., 394.
 Rietz, J. H., 176.
 Sales, Edw. K., 600.
 Schalk, K. W., 324.
 Schneider, J. E., 689.
 Schroeder, E. C., 270.
 Smith, Ernest I., 423.
 Stange, C. H., 512, 698.
 Tamblyn, D. S., 4.
 Tillisch, E. R., 58.
 Tuck, R. W., 470.
 Turner, Henry W., 28.
 Watson, E. A., 257.
 Welch, W. H., 33.
 Wigdor, Meyer, 686.
 Wilkins, Stanley Dean, 653.
 Williams, W. L., 124, 553.

Index of Subjects

Papers:

Abortion Disease, Field Observations on Control, 152.
 Abortion Disease, Infectious, Review of Publications, 270.
 Abortion, Contagious, Notes, 549.
 Amyloid Degeneration in Domesticated Animals, 568.
 Animal Engineer, The, 588.
 Anthelmintics, Studies on, 183, 453, 686.
 Anti-Blackleg Serum, 689.
 Army Meat Supply, 165.
 Baccharis Pteronioides, a Poisonous Plant of the Southwest, 430.
 Bacillus Bulgaricus in the Treatment of Intestinal Toxemias of Dogs, 696.
 Bacteriology of Reproductive Organs of the Cow, 46.
 Better Live Stock, 435.
 Botulinus Antitoxin, Production and Experimental Use, 638.
 Canadian Army Veterinary Corps in France, 4.
 Course to be Pursued in Laboratory Diagnosis, 525.
 Foot-and-Mouth Disease, Importance of Preparedness in Meeting Future Outbreaks, 579.
 Greetings to Veterinary Inspectors of Bureau of Animal Industry, 543.
 Heredity as Expressed by Our Stallion Registration Laws, 33.
 Hog Cholera, Duration of Immunity, 176.
 Influence of Health of Calf upon its Fertility at Breeding Age, 553.
 Insects in Relation to Production of Live Stock and Poultry, 415.
 Irregular Bones of Cattle, Some Changes in, 460.
 Limberneck in Poultry, 653.
 Mallein Test, Intradermic, Effect of, on Subsequent Complement-Fixation Tests for Glanders, 282.
 Meat Inspection and Its Value as a Safeguard to Public Health, 470.
 Micrococcus Isolated from Case of Broncho-Pneumonia (So-called "Flu") of Swine, 539.
 Parasitic Diseases in Relation to Live-Stock Industry of Southern United States, 395.
 Poisonous Plants of the South, 302.
 Practice, General, Some Observations in, 463.
 Presidential Address, 630.
 Professional Policies, Our, 512.
 Rabies and Its Preventive Treatment, 593.
 Rose-Chafer Poisoning in Chickens, 692.
 Sheep Practice, 314.
 Snuffles (Contagious Nasal Catarrh) of Rabbits, 317.
 Stallion Registration Laws, Heredity as Expressed by, 33.
 Strongylidosis in Horses and Mules, 147.
 Strongylus Rubidus as an Etiological Factor in Gastric Lesions of Hogs, 527.
 Swine Obstetrics, 58.
 Tick Eradication in the South, 423.
 Traumatic Indigestion and Pericarditis in Cattle, 698.
 Tuberculin Testing and Retesting, Further Observations, 28.
 Tuberculosis Control in Pennsylvania, 705.
 Tuberculosis Eradication, 439.

Ulcerative Lymphangitis or "Preis-Nocard Disease" of Horses, 257.
 Urticaria, 702.
 Veterinary Corps of American Expeditionary Forces, 61.
 Veterinary Education, 518.
 Veterinary Extension Work, Purpose and Scope, 161.
 Veterinary and Live-Stock Conditions in the South, 295.
 White or Calf Scours, 124.

Clinical and Case Reports:

Abdominal Wounds with Prolapse of Internal Organs, 324.
 Botulism in Chickens, 75.
 Forage Poisoning, 712.
 Gastro-Enteritis, Acute Toxic, 322.
 Melanotic Sarcoma and So-Called Melanosis, 480.
 Quittor Treatment as Carried Out in a French Military Hospital, 600.
 Rabies at Dow City, Iowa, Report on Outbreak, 477.

Abstracts:

Actinomycotic Pleurisy in a Dog, 328.
 Anemia, Infectious, of Horses, 79.
 Ascaris Lumbricoides, Observations on Life History, 607.
 Bacteria, Delicate, a Simple Method of Obtaining Permanent Cultures, 482.
 Brussel's Disease (Infectious Broncho-Pneumonia of the Horse), Bacteriological Study, 80.
 Cancer of Pancreas in Horse, 189.
 Diarrhea of Lambs, 80.
 Dochmiasis (Hookworm) in Hungarian Cattle, 329.
 Emphysema, Chronic, of Lungs, following Foot-and-Mouth Disease, 605.
 Erysipelas, 327.
 Foot-and-Mouth Disease, Transmissibility to Man, 188.
 Gas Gangrene of Man, Relation of, to Blackleg of Animals, 483.
 Glanders Control in Siebenburg Army, 78.
 Intestinal Coccidiosis of Sheep in Morocco, 719.
 Joint Ill in Foals, 720.
 Quartzlight Treatment in Skin Diseases of Domestic Animals, 484.
 Rabies, How a Dog of Healthy Appearance Can Transmit, 603.
 Trembles in Sheep, 190.
 Tuberculin, Possible Failure in Cows in Gestation or Just Calved, 718.
 Tuberculosis Control, Ostertag's Methods, 78.
 Ulcerous Lesions on Tongue and Larynx in Horse Reacting to Mallein after Contact with Glanders-Infected Animals, 327.
 Whorled Milkweed (Asclepias Galioides) as a Poisonous Plant, 604.

Army Veterinary Service:

Army Reorganization, 194.
 Army Reorganization Bill, 486.
 Army Veterinary School, 722.
 Director of Veterinary Corps Awarded Distinguished Service Medal, 192.
 Second Lieutenants, R. C., 194.
 Surgeon General's Office, News from, 191, 331, 486.

Association News:

American Veterinary Medical Association
 Directory of Members, 347.
 "Do It Now," 333.
 Notes from Secretary's Office, 232, 334,
 502, 614.
 Program of Fifty-Seventh Annual Meeting,
 610.
 Shrine Club of A. V. M. A., 615.
 Treasurer's Report, 233.
Proceedings of Fifty-Sixth Annual Meeting,
A. V. M. A., New Orleans

Discussion of Army Papers, 93.
 Discussion of Papers on infectious abor-
 tion, 89.
 Installation of new officers, 222.
 International Veterinary Congress, 92.
 Notice of amendment to Code of Ethics,
 202.
 Reports and appointment of Committees,
 201.
 Report of Auditing Committee, 220.
 Report of Committee on History, 83.
 Report of Committee on Infectious Abor-
 tion, 86.
 Report of Committee on Intelligence and
 Education, 202.
 Report of Committee on Legislation, 82.
 Report of Committee on Necrology, 489.
 Report of Committee on Resolutions, 218.
 Report of Executive Board, 81, 199.
 Report of Liautard Memorial Committee,
 83.
 Reports of Resident Secretaries, 225.
 Section on College Faculties and State
 Examining Boards, 494.
 Section on General Practice, 198.
 Section on Sanitary Science and Police,
 196.

Other Associations

Alabama Veterinary Medical Association,
 238.
 Alfalfa Club, 341.
 Allegheny Veterinary Club, 115.
 B. A. I. Veterinarians, National Associa-
 tion of, 103, 244.
 British Columbia Veterinary Association,
 105.
 Central Canada Veterinary Association, 111.
 Central New York Veterinary Medical As-
 sociation, 727.
 College of Veterinary Science of State
 College of Washington, 242.
 Colorado Veterinary Medical Association,
 107, 243, 647.
 Hudson Valley Veterinary Medical Asso-
 ciation, 501.
 Illinois Veterinary Medical Association, 341.
 Maine Veterinary Medical Association,
 115, 337.
 Metropolitan Division B. A. I. Veterinary
 Association, 244.
 Minnesota State Veterinary Medical Asso-
 ciation, 106, 339, 731.
 Mississippi State Veterinary Medical As-
 sociation, 109.
 Missouri Valley Veterinary Association,
 234.
 Montana Veterinary Medical Association,
 339.
 Nevada State Veterinary Association, 243.
 New Jersey, Veterinary Medical Associa-
 tion of, 729.

New York City, Veterinary Association of,
 239, 500.
 New York State Veterinary Medical Asso-
 ciation, 724.
 Northwestern Pennsylvania Veterinary
 Club, 730.
 Ohio Prepares to Entertain A. V. M. A. at
 Columbus, 101.
 Oklahoma Notes, 732.
 Ontario Veterinary College Graduating
 Exercises, 496.
 Pennsylvania State Veterinary Medical
 Association, 241.
 Philadelphia, Veterinary Club of, 616.
 Philippine Veterinary Medical Association,
 340.
 Prince Edward Island Veterinary Medical
 Association, 113, 733.
 Purdue University, Veterinary Conference
 at, 243.
 Rhode Island Veterinary Medical Associa-
 tion, 114.
 Southeastern States Veterinary Medical
 Association, 335.
 Tuberculosis Eradication Conference, 734.
 World War Veterans of America, 616.

Editorial:

An Opportunity, 254.
 Columbus Convention, 625.
 Cure-All for Man and Beast, 253.
 Decennial Pharmacopoeial Convention, 123.
 Federal Quarantine Justified, 1.
 Handicapping the B. A. I., 391.
 International Veterinary Congress, 387.
 One Veterinarian's Opinion of Hog Cholera
 Serum, 2.
 On to Columbus, 505.
 Relation of Veterinarian and Farmer, 628.
 Tractor and Horse, 629.
 Transfer of the Veterinary Corps, 393.
 Tuberculin Test Figures by Breeds, 256.
 Veterinarian and Civil Service, 119.
 Veterinary Profession and the Pharma-
 copoeia, 389.
 Veterinary Reconstruction, 507.

Book Reviews:

Diseases of Domesticated Birds. Ward
 and Gallagher, 329.
 Les Tuberculoses Animales. Vallée and
 Panisset, 485.
 Parasites and Parasitosis of the Domestic
 Animals. B. M. Underhill, 608.

Communications:

Appeal in Behalf of Prof. Hutyrá, 247.
 Army Behind the Army, The, 620.
 Dogs and Sheep, 250.
 Foot-and-Mouth Disease in France, 721.
 International Veterinary Congress, 246.
 Letters of Appreciation, 619.

Necrology:

Cosford, S. E., 342.
 Hughes, Joseph, 343.
 Kaylor, J. M., 195.
 McEvers, George, 344.
 Rike, C. H., 481.
 Robertson, Archibald K., 621.
 Stewart, Mrs. SESCO, 345.
 Winchester, J. F., 344.
 Young, Mrs. C. J., 481.
 Report of Committee, 489.

Miscellaneous:

Administrative Position in Agricultural
 Field for Another Veterinarian, 252.

- Appeal from Austrian Veterinarians, 434.
A Surprise, 345.
B. A. I. Resignations, 195.
Complaints from Members, 117.
Convention Notes, 741.
Dr. E. I. Smith—An Appreciation, 695.
Farm Cow a National Asset, 346.
Father Goose on Sheep Parasites, 552.
Garden Party in Honor of Dean and Mrs.
Hoskins, 717.
Honorary Degree for Dr. Rutherford, 624.
Industrial Research Laboratories in
America, 739.
More Good Horses Needed, 346.
New Veterinary Barn at University of
Minnesota, 502.
No Whiskey for Animals, 723.
Profession Honored, 504.
Stock Remedies, Tonics and Nostrums,
117.
Test for Army Horses, 251.
U. S. Retirement Law as It Affects
Veterinarians, 622.

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APRIL, 1920

No. 1

FEDERAL QUARANTINE JUSTIFIED

FOLLOWING a six-months' period of Federal quarantine, which was given the military horses brought from Europe, General Pershing's horse "Kedron" received his liberty on February 23.

At that time representatives of the Bureau of Animal Industry and the Veterinary Corps, U. S. A., pronounced him healthy and in excellent condition. The mount of Col. Theodore Roosevelt Jr., which was in the same lot, received a similar bill of health—not so, however, with several other animals in the shipment.

One horse was found affected with the destructive disease, ulcerative lymphangitis. This is prevalent in the war-torn area of Europe, is contagious, and very hard to cure.

Another horse had contracted trypanosomiasis, which was caused by the entrance of one of the species of trypanosomes into the circulatory system. The disease is related to surra, nagana and other dreaded foreign scourges, also to dourine, or "equine syphilis."

Both of the horses last mentioned were killed and the carcasses destroyed by burning. In addition, the stables in which they had been kept were thoroughly cleaned and disinfected.

Another horse developed sarcoptic mange. Unlike ordinary

mange, the sarcoptic parasite burrows into the skin, forming galleries in the middle layer, and in those hiding places the mange mite is hard to reach with parasitic remedies. Still another horse died in quarantine.

The entire shipment of 116 horses which left Bordeaux, France, last August was sent to Camp Hill, the quarantine station near Newport News, Va. Aside from the four animals mentioned and two that showed slight skin lesions, the horses remained healthy.

Each horse occupied a separate box stall and never had an opportunity to come in contact with others. Each also had separate equipment, such as brushes, pails, feed boxes and halters, during the period of quarantine.

The purpose of such care and supervision, of course, is to protect the live-stock industry in the United States from contagion that exists abroad. It will be recalled that notwithstanding vigorous opposition, the quarantine regulations prevented General Pershing's horse from appearing in the various Victory parades. It will also be remembered that following the Spanish-American War General Leonard Wood was unable to bring home his "charger" from the Philippines on account of the danger of importing some oriental equine disease. In fact, according to the Federal Bureau of Animal Industry, no exceptions have ever been made to the regulations prohibiting the bringing in of live-stock from the Philippine Islands. Judging from the results obtained at Newport News, it must be conceded that the establishment of the quarantine was in every way justifiable. If the quarantine had not been established and these horses had been allowed to go free in the United States, they very probably would have been the means of spreading their infections to such an extent that it would have been necessary to spend many thousands of dollars to eradicate the maladies, even if possible of eradication. This was the experience of Great Britain following the Boer War, when large numbers of army horses were permitted to be returned from South Africa without quarantine.

ONE VETERINARIAN'S OPINION OF HOG CHOLERA SERUM

DURING the recent discussion in the House of Representatives of the item in the Agricultural Appropriation Bill providing funds for continuing the hog cholera field work during the next fiscal year, the Chairman of the House Committee on Agriculture read the

following letter from a veterinarian of Iowa, which is quoted as it appears in the *Congressional Record* of February 7, 1920:

"Dear Sir: I see the appropriation matter for fighting hog sickness is up for consideration now, so I thought I might be able to cast a little light upon the subject. You will see that I, with a lot of my patrons and friends, are interested. I am interested from a professional standpoint—a breeder myself—and for a lot of my friends and for breeders who have been stung by this serum mistake. It is a failure as a preventative and a cure. Seven years has proved that it neither prevents nor cures the disease, while, on the other hand, it has killed thousands of well hogs and spread disease into thousands of well herds and caused unnecessary expense and loss. It will continue to do so as long as it is used.

"Every dollar that Congress appropriates to further the manufacture and use of serum is only pouring oil upon the burning fire and helping a lot of fellows who are taking advantage of the conditions to graft off the unfortunate hog men.

"Stop the use of serum and spend \$100,000 one year in this way, and make a lot of political soft-job grafters keep their mouths shut for one year and quit sending in false reports of how many thousand hogs serum has saved. Then we will stop the whole trouble. But as long as Congress and the Secretary of Agriculture will be dictated to and listen to these Bureau of Animal Industry serum boosters and agriculture college boosters and veterinary college boosters, who all have an ax to grind, just that long hog sickness will continue to spread and rage and cause loss. I think seven years has been long enough to aid these jobbers and grafters in their fat jobs."

So far as the veterinary profession in general is concerned this letter needs no comment, but it would be deplorable if such material should have any weight in influencing the judgment of our Congressmen in providing funds for a public service so important to the swine industry of the country. No one can tell just what effect this letter did have, but no doubt the author will take some consolation to himself in learning of the recent action of the House of Representatives, whereby the appropriation for hog cholera work was reduced from \$641,045 to \$410,000, which amount includes funds for the supervision of serum plants and research work, as well as control work in the field.

THE CANADIAN ARMY VETERINARY CORPS¹ IN FRANCE¹

By LIEUTENANT-COLONEL D. S. TAMBLYN, *Canadian Army
Veterinary Corps*

AT the outset I wish to point out that the Canadian Army Veterinary Corps in France and Belgium during the campaign came under the Director of Veterinary Services of the British forces, and it was from him through his Deputy Director of Veterinary Services that the Assistant Director of Veterinary Services, Canadian Corps, received his instructions. While the Canadian forces were proudly a possessor of a Director of Veterinary Services, who resided in London and formed part of the Canadian staff at that point, his jurisdiction was restricted to those units in England.

COMPOSITION

The Canadian Army Veterinary Corps was composed of the following:

44 officers, C. A. V. C.
163 other ranks.

This personnel was distributed as follows:

	<i>Veterinary Officers</i>	<i>Other Ranks</i>
Assistant Director of Veterinary Services.....	1	
Deputy Assistant Director of Veterinary Services...	4	
Canadian Corps veterinary evacuating station.....	1	38
Canadian Corps troops.....	1	1
Mobile veterinary sections.....	4	52
Canadian railway troops.....	1	1
Divisional trains	4	4
Infantry brigades	12	20
Artillery brigades	11	34
Divisional ammunition columns.....	5	13
	44	163

FUNCTIONS AND METHOD OF PROCEDURE

Assistant Director of Veterinary Services

This officer was head of the Canadian Army Veterinary Corps within Canadian Corps. He was directly responsible to General Officer Commanding Canadian Corps, through the Deputy Adjutant

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

and Quartermaster General, for the welfare and care of all animals. He administered the divisions of the corps through the Deputy Assistant Directors of Veterinary Services of those formations. Corps troops and all units attached were administered by him direct. He insured that the veterinary administration and attendance of units left in the line when divisions moved, and all units arriving within the Corps area, were provided for. His administration was confined, as far as possible, to practical matters, so that his duties would take him more out in the field than in office, and so that by constant and systematic inspection of units and supervision in all matters affecting Veterinary Services and animals generally, disease was prevented and wastage kept down to the lowest degree. Decentralization of administration was his guiding principle.

The Remount Service of the Canadian Corps also came under his administration, so that in reality he filled a dual position, and in this regard his duties differed from those of an Imperial Assistant Director of Veterinary Services and were more arduous.

The position held by the Assistant Director of Veterinary Services was a very important one, as the efficiency and effectiveness of the Canadian Army Veterinary Corps rested entirely on his shoulders.

Canadian Corps Veterinary Evacuating Station

This unit was commanded by a veterinary officer with the rank of major and a personnel of 38 noncommissioned officers and other ranks, and acted as a casualty clearing station for the mobile veterinary sections of the divisions and Corps troops. Animals received were shipped to base hospitals, at which points minor and major operations were performed. During the animals' sojourn at the veterinary evacuating station temporary treatment was provided and everything done to alleviate suffering. The care of animals generally was all that could be asked for at this particular unit.

Deputy Assistant Directors of Veterinary Services

These officers were responsible to divisional commanders and Assistant Director of Veterinary Services, Corps Headquarters, and they administered their particular divisions. Their responsibilities were of a more active nature than those of the Assistant Director of Veterinary Services, but in a smaller way. They had to be alive to the general condition of the animals with a view of determining any cause of wastage, while they were also responsible in seeing

that shoeing, grooming, feeding, and sanitation of transport and wagon lines were not neglected, and further, that all contagious and infectious diseases were kept in check so as to prevent any large outbreak. These officers had also to deal with the demands for remounts and keep a correct check of all animal strengths and account for losses in all forms. Their services as instructional officers, in the form of lecturers to officers, noncommissioned officers and men of divisional trains, infantry transport and artillery wagon lines, were a very important part of their duties. The inspection of veterinary equipment was regularly carried out.

Mobile Veterinary Sections

Apart from the foregoing, the Deputy Assistant Directors had under their administration, attached to the division, the mobile veterinary section, which was a very necessary unit for handling sick and wounded animals. This section took over from units all sick and wounded animals, which were generally transferred to Canadian Corps veterinary evacuating station. When the division was in battle formation advanced posts were put out with a view of receiving wounded animals and giving "first aid" treatment. It was from these posts that all severely wounded cases were collected and sent by ambulance to mobile veterinary sections.

Veterinary Officers

The duties of veterinary officers in infantry brigades, artillery brigades, divisional ammunition columns, railway troops, engineer brigades, cavalry brigades and Corps troops were practically the same. They were responsible to their officer commanding and their Deputy Director of Veterinary Services. Their duties called for very sound judgment relative to animal management in the field, and it was upon the veterinary officer that the officer commanding depended for advice in this connection. A considerable amount of their work was carried out under shell fire in the vicinity of the line, while they were held responsible to the Deputy Assistant Directors of Veterinary Services for the correct accounting for all animals under their charge.

Sergeants, Canadian Army Veterinary Corps

The duties of these indispensable noncommissioned officers were to render first aid services in the absence of the veterinary officer, and to draw attention of the veterinary officer to sick and injured animals, especially suspected cases of infectious and contagious

diseases, or any irregularities in animal management which came under their notice. Their duties also called upon them to fulfil the veterinary officers' instructions relative to medicinal treatment and dressing of wounds, etc., or in other words to see that the veterinary officers' instructions were carried out to the letter.

Canadian Army Veterinary Corps Reinforcements

In the field, reinforcements for the Canadian Army Veterinary Corps were obtained from Canadian Army Veterinary Corps base details in France.

Drugs and Instruments

Each veterinary officer was supplied with a field veterinary chest containing drugs and instruments complete, as also a wallet for first-aid work, which were sufficient to meet current demands. A 25-pound unit chest, for use in cases of emergency, was supplied to units. Sergeants, Canadian Army Veterinary Corps, were supplied with a veterinary wallet. These chests and wallets were refilled from time to time from the base on indent through the Assistant Director of Veterinary Services, Corps Headquarters.

Serums and Antitoxins

These were made use of to a great extent both from a prophylactic and a curative point of view.

Remarks

Since the functions of the Veterinary Services as a whole in the field were directed toward reducing to the lowest possible degree wastage of animal strength, no more accurate indication of the conduct of these services can be given than a statement of percentages by comparison in wastage. For purposes of this paper the percentages of animal wastage in the Canadian Corps during the months of December, 1917, and January, February and March, 1918, are compared with the percentages of wastage for the same period in the army of which the Canadian Corps formed a part. These four months were selected for two reasons, viz.: (1) They constitute the season in the field during which the highest percentage of wastage from sickness and accident may be expected to occur. (2) During the months indicated, the Canadian Corps was continually in action.

Percentage of wastage, Canadian Corps.....	56 per cent
Percentage of wastage, total army.....	74 per cent

The average for the Canadian Corps was thus 18 per cent lower than the other corps forming part of this army. It will be understood that these percentages included wastage from enemy fire as well.

Animal Strength

The general average strength of animals in Canadian Corps was approximately 23,500. Apart from the foregoing, there were at times Imperial divisions and artillery brigades attached to Canadian Corps including the Canadian animals, and the total number for veterinary administration often reached the high figure of 50,000 in one week.

I may point out that this important branch of the service was little heard of; in fact, one might term it the "silent branch," but when consideration is given to the fact that the mobility of troops depended absolutely on the animal transport it will be seen that the necessity of maintaining a high standard of efficiency in the animals themselves was of vital importance.

SUGGESTIONS MADE FOR IMPROVEMENT

I think it would be in order for me to give you a résumé of my suggestions submitted to the War Office regarding alterations which could be advantageously made to the organization of Canadian Army Veterinary Corps or Royal Army Veterinary Corps with a division. Many of these were accepted.

1. *State generally what alterations, if any, could advantageously be made to the organization of Royal Army Veterinary Corps with a division.*

The establishment of a division should be increased to 12 veterinary officers and 30 sergeants, A. V. C., distributed as follows:

Present Establishment, Veterinary Officers of Division

Deputy Assistant Director of Veterinary Services, divisional headquarters—major.....	1
Divisional train—captain	1
Three infantry brigades—lieutenants.....	3
Divisional ammunition column—lieutenant.....	1
Two artillery brigades—lieutenants.....	2

8

Present Establishment, Sergeants, A. V. C., of Division

Three infantry brigades.....	3
Divisional ammunition column.....	3

Artillery brigades	8
Machine-gun battalion	1
	<hr/>
	15

Proposed Establishment

Deputy Assistant Director of Veterinary Services, divisional headquarters—major.....	1
Divisional train—captain	1
Four infantry brigades—lieutenants.....	4
Divisional ammunition column—lieutenant.....	1
Three artillery brigades—lieutenants.....	3
Machine-gun battalion	1
Canadian Engineer brigade—lieutenant.....	1
	<hr/>
	12

Sergeants, A. V. C., 30, distributed as follows:

Divisional headquarters	1
Divisional train	1
Four infantry brigades.....	4
Four sections divisional ammunition column.....	4
Twelve artillery batteries.....	12
Machine-gun brigade	4
Canadian Engineer brigade.....	4
	<hr/>
	30

Royal Army Veterinary Corps personnel should be supplied to officers to act as batmen and grooms, total 26.

All Royal Army Veterinary Corps personnel of divisions to come under the Deputy Assistant Director of Veterinary Services, to whom they will be attached for discipline and posting within divisions, as in Royal Army Medical Corps.

Horse establishments for officers and sergeants, Royal Army Veterinary Corps, should be 54, 2 for veterinary officers (each), 1 for noncommissioned officers.

2. *Are you in favor of the mobile veterinary section as part of this division?*

Yes, I favor a mobile veterinary section as part of a division, with the following increase in personnel establishment and equipment:

1 officer (captain).
30 other ranks.

The noncommissioned officers of a mobile section should be as follows:

- 1 sergeant-major.
- 2 sergeants.
- 2 corporals.
- 1 shoeing corporal.

Increased personnel is suggested on account of the great demand for veterinary patrols from mobile veterinary sections during active operations in divisional areas. This was more felt in open warfare.

Horse establishment suggested for mobile veterinary section is as follows:

- Heavy draught, 2
- Riding, 30

Equipment.—Increased ambulance accommodation:

- 1 motor ambulance.
- 1 horse float (light).

The cumbersome floats as at present supplied have not proved satisfactory; they only tend to impede the work of the mobile veterinary section. Something durable and light running is what is required, and with not less than 14 inches road clearance. One general service wagon is also necessary.

Apart from the above the veterinary equipment of the mobile veterinary section is not complete and the following is required:

- (1) New field veterinary chests should be planned.
- (2) Field instrument chest should be supplied.
- (3) Complete set of dental instruments.
- (4) Electric torches on a larger scale should be issued.
- (5) Complete set of hobbles.
- (6) Microscope including 1/16 lens and accessories.
- (7) Selection of mobile veterinary section location should be left to the Deputy Assistant Director of Veterinary Services in conjunction with Quartermaster General's Branch and not entirely to the Divisional Headquarters, Quartermaster General's Branch. Mobile veterinary section should receive priority in this connection.

The reason for the first suggestion is on account of the large wastage of drugs by the mobile veterinary section having to carry them in bulk. Two chests are required to carry the drugs of the mobile veterinary section, which should be built on a larger scale than those at present in use, while it is absolutely essential that these chests should be waterproof and thus assure all drugs being kept compact and dry, which is at times impossible to carry into effect under the present arrangement. The deterioration of drugs when exposed to wet climatic conditions must be obviously recognized without further comment.

The use of tins as containers for drugs is not satisfactory; bottles with wide-mouth tops are preferable.

The supplying of a field veterinary instrument chest is absolutely essential if it is the intention to conduct an efficient and effective mobile veterinary section. Such chests should contain an ample supply of scalpels, bullet and artery forceps, probes, etc., as well as a complete set of postmortem instruments. The non-supplying of such a chest during the past campaign has been a great handicap in the conducting of mobile veterinary work.

Relative to suggestion No. 3, "Dental Instruments," no one knows better than those who have served in the field what great inconvenience the transports have been subjected to by the non-supplying of such. Many thousands of horses and mules would never have been evacuated had such been procurable at the front. These instruments should be kept at the mobile veterinary section and any dental work performed there. Dental work should not be entrusted to sergeants. The results of the work of these noncommissioned officers are usually suicidal in this connection, as in place of the animals' teeth being improved they are very often ruined from want of technical knowledge.

Suggestion No. 4, electric torches are an indispensable article in the collecting of animals and picket work around the section. The chances of fire would be greatly minimized.

Suggestion No. 5, "Complete set of hobbles." The supplying of such does not appear essential from an army point of view, yet to my mind they are indispensable, and I think all practical-minded men of the profession will coincide with me. I therefore do not propose to dilate any further on this point.

Suggestion No. 6. I think that officers commanding mobile veterinary sections should have a knowledge of bacteriology and pathology. This would be of great advantage.

Suggestion No. 7 is important from an efficiency point of view. Preference of standings and site for a mobile veterinary section is essential, especially if it is intended to carry out even the slightest treatment and care for sick and wounded animals as they should be cared for. The location of sites of some mobile veterinary sections I have visited have been nothing more than cesspools. For want of material and proper supervision, aseptic conditions under such care are impossible, and yet results were looked for and the wastage in animal flesh expected to be kept low.

The advantages of a mobile veterinary section with a division

are many, more so in open than in trench warfare. It serves as a connecting link between the forward and the rear, which is of utmost importance when you meet with large numbers of casualties. It gives a quick means of disposing of casualties from the forward area and working in conjunction with the field veterinary hospitals an efficient and effective service is maintained, while without such the work of the Royal Army Veterinary Corps would suffer to a great extent. To my mind there is only one reply regarding the maintenance of a mobile veterinary section, and that is in the positive. The advantages are too many to go into detail here.

Every division possessed a mobile veterinary section, the function of which is to form a combined collecting station for the sick and a field veterinary hospital. It is composed of an officer, non-commissioned officers and men of the Canadian Army Veterinary Corps, and is provided with its own transport for stores and equipment. Wherever the division goes its mobile veterinary section accompanies it.

The cases sent to a mobile veterinary section are broadly of two kinds, those which will be fit again in a few days and those requiring prolonged treatment. The governing principle in working a mobile section is that it must evacuate its serious or prolonged cases in order to continue to perform its function as a collecting station in the field. The location of the mobile section is known throughout the division; it flies a distinguishing flag, and at night distinctive colored lanterns are displayed. In stationary warfare it is connected up by telephone with the headquarters of the division, and care is taken in selecting its site that suitable accommodation is provided. For example, it is no use locating a mobile veterinary section some distance from a water supply, or away from a main road.

In mobile warfare the section, in addition to receiving sick, has also to collect any animals abandoned by the division. There are always some which at the last moment are found unable to accompany their units, and these are left behind with a horse recovery form and with the full knowledge that they will not be neglected. When a division is moving, its mobile veterinary section is the last to march off, and time is thus given to collect waifs and strays and make a final evacuation of those animals intended for hospital.

Every animal sent to a field veterinary section is accompanied by a form which gives the name of the unit to which it belongs, the disease from which it is suffering and a description of the animal

for the purpose of identification. On admission this is checked, the diagnosis verified and a serial number allotted which is placed on a label tied to the head collar. A special colored label is also tied on, embodying the ascertained facts regarding the cause of inefficiency, a white label being used for medical cases, green for surgical, red for contagious and blue for casting. In addition each animal bears a stencil mark in paint on the quarter, showing the number of the mobile veterinary section to which it belongs.

A careful examination of all patients received by a veterinary section is of the utmost importance, for it is here that cases of contagious diseases may be caught in their earliest stages. If the system described is followed out, it is known at once to which unit of the division the animal belongs, and notification of the existence of contagious disease is sent it as a warning.

No more important duty exists than the early and thorough examination of the sick, otherwise cases of incurable and highly infectious diseases, such as glanders, will be sent back to the base and mixed up on the way with unaffected horses. Great judgment is also required in deciding which of the ordinary cases may with advantage be retained for treatment and which should go back to base hospitals. Every animal sent back unnecessarily is a loss to the division and a source of expense to the state.

3. *Have you any other proposals or suggestions to put forward with regard to the general organization and composition of Royal Army Veterinary Corps with a division?*

(1) I would point out that the unit chest supplied is inadequate and too fragile. Such a chest should be built of a more solid material and be waterproof. The containers should be bottles and not tins. A watch-case atomizer in place of the old iodine bottle and brush. The inclusion of an enema pump; brass dressing syringe; dressing scissors; bistoury, P. P.; probe, 10-inch; forceps, bullet 12-inch; searching knife.

(2) Abolishing of all officers' field chests. By substituting such a unit chest as described above, the officers' field chest could very well be done away with.

(3) Remodeling of officers' and sergeants' wallets. Officers' wallets to be in the nature of a first-aid surgical equipment. Sergeants' first-aid medical equipment.

(4) Increased office personnel for Deputy Assistant Director of Veterinary Services: 1 staff sergeant, 1 sergeant, 1 other rank. The reason for this increase is that under this proposed scheme the entire

Remount Service above railway head would be handled by the Royal Army Veterinary Corps as now in Canadian formations.

(5) Dispensing with all horse advisors. Such appointments within a division only interfere with animal management in the field and lessen the efficiency of the transport generally. The services of the Royal Army Veterinary Corps officers should be taken advantage of more often in all matters appertaining to the care and management of animals, i. e., construction of standings, feeding, watering, stabling, sanitation, bodily hygiene, clipping, reports on ill-fitting harness, etc. More scope to Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services is the only means of bringing out the practical ability of any administrative officer and to insure results.

Further, we require to get in touch with all branches of the service more than we do and interest the senior officers as to the importance of the Royal Army Veterinary Corps. They do not understand us, so that it is our duty to educate them along our ways of thinking. Senior officers do not realize the great assistance this branch of the service could be to them and their command, nor do they, in many cases, appreciate its work, so that the profession in the Army in the future is what we make it.

(6) There should be attached to the Deputy Assistant Director of Veterinary Services office one veterinary officer as an assistant. This officer would perform the following duties:

(a) Remount services within the division.

(b) Lecturer to horse units throughout the division. (This officer would follow a definite line in his lecture so that the care of animals would be coordinated throughout the division, thus bringing one policy into force.)

(c) To act as executive officer to Divisional Headquarters and attached unit.

(d) To replace temporarily officer casualties.

(7) Elimination of horses with poor conformation and of old age. Authority should be given to Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services to condemn such animals. The condemning brand should be applied to the animals immediately with a view to disposing of them to whatever market is available. Such action would bring about financial saving as well as increasing efficiency generally.

(a) Relieve congestion at base hospitals.

(b) Would eliminate all unserviceable animals which are of no real service to the unit.

(c) Would save railway transportation.

(d) Would prevent such animals being returned to the front, which is of the greatest importance, for animals so returned seldom last a month, and consequently are immediately turned into the mobile veterinary section.

It will therefore be seen that the cost in transporting these animals to and from the base hospitals as well as feeding them is not justifiable to say the least.

(8) Motor car for Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services. To enable these officers to carry on their duties satisfactorily and effectively, it is absolutely essential that a car be placed at their disposal *entirely* and not be included in any pool.

(9) Telephone. This is a very necessary instrument for the Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services offices.

(10) Typewriter. This is essential so as to prepare reports and circular letters and assure neatness of rendering.

(11) The foregoing facilities must be afforded Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services. If this is not done, then senior officers of this branch of the service are not in a position to criticize the work of the junior. This must be obvious without further comment.

(12) Permanent wagon line officers. Permanent wagon line officers for artillery batteries are of the utmost importance. The artillery officer of today is too busy with the tactical end of his work, consequently the artillery horses suffer. This lack of supervision within artillery horse lines affects this branch of the service to a great extent, for unless we have proper supervision in such lines the animals go down in condition, thereby increasing our wastage and bringing undue criticism to this branch of the service. Therefore it is necessary for us to take every possible step to have the artillery establishment so altered to include an officer *who would not be a gunner but a horseman*.

(13) The regulations relative to the evacuation of animals for veterinary reasons should be reconstructed in such a manner as to give any veterinary officer the authority to make such evacuations as he may see fit. For the officer commanding any particular unit to have the authority to refuse to evacuate any animal when advised to do so interferes with the mobility of the unit's transport.

A more favorable consideration of suggestions put forward by

Assistant Directors of Veterinary Services and Deputy Assistant Directors of Veterinary Services. The lack of interest in and adoption of such suggestions is appalling and disheartening to say the least, and it only tends to lead to lack of interest on the part of junior officers. Why this should be is more than one can tell. It would appear that senior officers were afraid to deviate from the line laid down by their predecessor.

Veterinary examination stations. This term incorrectly describes the stations. I do not consider that we were obtaining the best results from our veterinary examining stations. I would suggest that the title be changed to "mobile field veterinary hospital." Such a unit carried on as the name implies would be most useful. Minor surgical cases and debilitated animals could be treated in place of evacuating to base, thus lessening the congestion at base hospitals, and railway transportation, which is so very essential in all modes of warfare. With some such change I feel sure that the efficiency and effectiveness of this branch of the service would be greatly increased. However, to carry such into effect would mean an increase in personnel to the extent of 3 officers and 75 other ranks, and the equipment to cope with the situation. Such a hospital should be used as a convalescent hospital.

Suggested corps establishment:

Assistant Director of Veterinary Services—lieutenant colonel...	1
Deputy Assistant Director of Veterinary Services—major.....	1
Warrant officer	1
Staff sergeant	1
Sergeant	1
Other ranks	3

8

(Note.—The 3 other ranks include batman and groom for Assistant Director of Veterinary Services and Deputy Assistant Director of Veterinary Services.)

Further Suggestions of Methods and Appliances

I also wish to bring to your attention certain suggestions offered by me from time to time and which should appeal to the officers of the American Veterinary Corps.

Convenient means by which hay can be fed.—Picket line post should be 8 feet in height above ground and a twisted wire placed from one post to another about 5 feet high, from which hay nets can be suspended. Posts should be placed at intervals of 15 feet

and should be wired to protect them. This manner of feeding hay would bring about a great saving in both hay and hay nets, as the animals will not be able to trample on them.

Watch-case atomizer.—This atomizer is put on the market by an American firm and sold by Messrs. Arnold & Sons, London. It has proved a very useful article for veterinary officers and veterinary sergeants, C. A. V. C., in the field. I purchased a large number of these, resulting in a great saving of iodine; in fact I would go so far as to say that veterinary officers waste more iodine in the dressing of one ordinary wound, with the use of the bottle and camel's hair brush as supplied, than would fill the atomizer, with which a dozen such wounds could ordinarily be dressed without refilling.

It has many advantages:

1. Convenient to carry on one's person.
2. Always at hand.
3. Less liable to break than the bottle.
4. More adaptable for dressing of wounds.
5. A more even dressing of iodine can be applied.
6. Useful in case of small punctured wounds.
7. I find that when a convenient method of dressing wounds is afforded, veterinary officers and veterinary sergeants dress the wounds more frequently and earlier, both of which are important, especially the latter.
8. Does away with the use of absorbent cotton for the application of iodine.
9. The use of such an atomizer would result in the saving of iodine, at least 75 per cent, while there would be a great saving in absorbent cotton and better results obtained.

I would strongly advise the adoption of this article, both from an efficiency and economical point of view.

Suggested distribution for a division including mobile veterinary sections, 36.

Harness.—Size issue very much too large. If a smaller size were issued a considerable saving could be brought about in leather. Animals would be able to perform their work to greater advantage. Breeching breast collar and neck straps were where most fault was found.

Halter or head collars supplied were well made and of good quality, but no difference was made regarding sizes.

Head ropes were quite good, but a hopeless article for winter use, and the animals would chew them through overnight. The chain was most serviceable.

Nose bags, supply good. Their life during winter was only a few days.

Rope hay net, a very indispensable article, and when used in conjunction with the overhead hay-net line no better means of feeding hay could be adopted. Wire hay nets were tried out but proved useless on account of animals trampling on them and difficulty in transporting.

Remounts.—Remounts were generally good, but at times unsatisfactory on account of inferior class of animals being supplied.

General faults were: Return of unserviceable animals—cribbers, wind suckers, vice, jibbers, blind; early return of animals from hospital before complete cure was obtained (quittors, mange and debility). The above vices and diseases greatly detract from the animals' utility. Such animals should be cast and sold, but in the majority of cases they were shipped to the front and in turn were immediately sent to mobile veterinary sections for evacuation, rendering no service whatever.

The English remount officials appear to judge light draft and heavy draft by the feather on the legs. Many of the heavy draft were not even light draft. In fact they often did not reach 1,000 pound—a useless animal for divisional train or ambulance work. The valuation of weight in heavy draft is most important; a horse that does not weigh at least 1,400 pounds should not be considered a heavy draft horse. In addition the weight must be the outcome of strong bone, heavy muscles, large proportions and well coupled.

Remounts received were generally in good condition, but soft, and it was very important that they should be gradually brought to work, otherwise the life of such animals in the winter months was only a few weeks, so debilitated did they become through overwork and exposure to climatic conditions; in short, such animals required a great deal of care and attention, while it was the policy to segregate them for three weeks before permitting them to mix with other animals of the unit, and have the veterinary officer certify to their freeness from contagious and infectious diseases.

Advanced aid post was found most necessary and rendered excellent service. Such a post, however, should be well in the front (under cover if possible). At these posts there should be maintained a veterinary officer or veterinary sergeant, one shoeing smith and two other ranks, for first-aid dressing is required at all times of the day and night, while the service of a farrier with spare shoes and nails is essential where fascine-made roads are traveled by pack animals in the advanced areas. Often animals pulled all four shoes and others one or two. This, however, was greatly remedied by shoeing short at the heels.

Field service horse-dipping vat.—When the vat is situated in a clay soil it is not necessary to line it with galvanized iron. On the other hand, should the soil be porous the vat must be lined with zinc or galvanized iron. The lumber shown in plan is intended for a permanent structure, but lighter lumber may be made use of if only for temporary purposes. When lumber only is used in clay soil, joints should be well caulked with tow. Bath-mats should be used at the bottom of the vat. The calcium sulphate solution should not be prepared in the vat but in tanks especially provided for this purpose. Dripping platforms and corrals may be constructed at both ends of the chute if deemed necessary. The capacity of the vat is about 2,750 gallons and 300 to 400 horses can be dipped per day. The solution may be heated by live steam from a portable engine or small heater situated level with the bottom of the vat. The vat can be drained into a cesspool by means of a drain cock in the bottom. A leg bath at the incoming end of the vat is advisable in wet climates. Running animals through this bath prior to dipping keeps the mixture free from contamination and saves replenishing the mixture as often as would be necessary without it.

The construction of standings.—Numerous suggestions have been submitted by myself and others in this connection, and it has been particularly suggested that such standings be constructed just off macadamized roads. This advice, however, was given a deaf ear, with the consequence, there is no doubt whatever, that the hard and heavy work brought about by the construction of standings far from macadamized roads, and through walking through mud knee deep, was the cause of our evacuating 25 per cent of our animals in one winter. In some instances the Canadian Field Artillery found it impossible to get to their horse standings, so deep was the mud, while in other instances they found it necessary to construct roads leading to standings, which took up enormous quantities of engineering material; in fact, so much so that it would have been far more economical to have built new standings in a suitable location and left the old standings unoccupied. This also applied to watering troughs for animals.

Horse blankets.—No action was taken to discriminate between the large and small animals when issuing blankets. At least two sizes should be issued, one for heavy draft and another for light draft saddle or pack animals. The blankets issued are too large, consequently hang very loosely, the animals therefore having a better opportunity to lay hold of them, than if they were made to fit fairly

tight around the neck, while the material used in the making would be reduced one-third. They should be double-breasted and waterproof, while a special arrangement should be worked out so as to prevent the animal from moving it out of position.

Suggestions to Prevent Wastage

In view of the great wastage in horse flesh and the difficulty in getting suitable remounts to replace those evacuated, I would suggest the following measure as a means of preventing a recurrence:

1. That a portable chaff-cutting and oat-crushing machine be supplied to each division, together with a 6-horsepower gasoline engine to run it. The cost of running such a plant would pay for itself inside a week. An engine as above mentioned would consume about 6 gallons of gasoline per day (12 hours). Three men would be required to operate the plant.

This would permit all units within the division to feed their animals half crushed oats and to chaff half their hay. I do not consider it policy to chaff all the hay; half should be fed long and at night in hay nets suspended for overhead hay-net lines, as suggested by me. This method of feeding hay has proved to save at least two-fifths of the hay ration. I would go so far as to say that overhead hay-net lines, or racks, should be insisted upon.

I would place the plant at a convenient point between the Canadian Field Artillery and the divisional train. The train could deliver half the oat and hay ration to the plant and take same back in the crushed and chaff form to the dump the following day. Units would draw from the dumps.

Such a policy in handling forage would bring about a great saving in personnel, as the issue of individual chaff-cutting machines, which take three or four men each to operate, would be entirely done away with. The worst feature of issuing chaff-cutting machines to units is that their transport facilities are too limited and therefore many look upon them as a nuisance and consequently no care is taken of the machines, which means that they are seldom in use and sooner or later are discarded.

This suggestion, if it is to be of any benefit, should be treated as a matter of great urgency, and not delayed until the animals are in that low physical condition which will take at least five months to build them up again. The advantages of crushed oats is not because the animal is unable to grind them with his teeth, but to insure that the husk of the grain is split, so that any which may escape

mastication may be readily acted upon by the gastric and other fluids during the process of digestion, thereby obtaining the best results with as little feed as possible. The feeding of hay as chaff, is, to say the least, economical, and when oats are mixed with same it insures thorough mastication.

The feeding of crushed oats and chaff has been fully demonstrated by certain units, i. e., Princess Patricia, Canadian Light Infantry, Royal Canadian Rifles, La Hore Artillery divisional ammunition column., 3d Canadian Division, Canadian Field Artillery, and others, and I venture to say that if such a method were adopted our wastage in animal flesh would be reduced 30 to 50 per cent.

Boiled feed.—This manner of feeding oats, bran and linseed during the winter assisted greatly in the maintenance of flesh, while it prevented wastage, for when not boiled bran was generally fed dry and often left exposed to the wet, while linseed would not be fed at all.

Veterinary officers supervised the feeding of these foods by insisting upon the transport officers and wagon-line officer constructing an improvised boiler usually made from an 8-foot sheet of galvanized iron and 2 by 6 foot planks. The iron was nailed on to the side of the planks and these rested on two brick or stone walls sufficiently high to permit of a fire being made underneath. The top was generally covered by a second piece of iron. This manner of boiling was most adaptable for field operations.

2. As before mentioned, permanent wagon-line officers for artillery batteries are of the utmost importance. The artillery officer of today is too busy with the tactical end of his work and consequently the horses in the wagon line suffer. It is an impossible task to keep animals in a fit condition unless there is proper supervision in the wagon lines. Many artillery officers are sent to the lines for a "rest" or some other such reason, and in the majority of these cases they are lacking in experience as far as the care of animals is concerned. This is suicidal.

There were a number of noncommissioned officers within the transport lines throughout the Division who had practical experience before the war, that would, with their militia training, have made ideal wagon-line officers, and whose services should have been taken full advantage of.

3. *Clipping operations.*—When enforced, I am in favor of the clipping of all horses, such to be taken in hand as early as possible; late clipping I oppose unless for veterinary reasons. The clipping

of mules is not of so much importance, as this animal's coat is short, thereby permitting a more thorough grooming.

By establishing three clipping stations—one at the D. A. C., one at the divisional train, and one central to the infantry brigades, the latter taking in all infantry bridges and other smaller units—you concentrate your machines and personnel, while the work is carried out under the supervision of a veterinary officer who would examine all animals for skin disease before leaving the depot. If clipping is left to units' transport officers the machines are broken and the work delayed for want of spare parts and because of differences of opinion.

Most officers are of the opinion that the wastage in animal flesh four winters ago was due to clipping. I admit that clipping *so late* did not improve conditions. I do not think, however, that we would have reduced the wastage to any extent if we had not clipped. I attribute the wastage to fast and heavy work and lack of supervision in the feeding of the animals. It is impossible, when one reviews our past experience, to expect any animal to exist on from 2 to 3 pounds of hay per day. This was all he was getting, as the balance of the hay ration was being trampled in the mud. The extreme weather conditions and exposure were also a great factor in the causing of wastage, and their effects were seen to just as great an extent in animals which had not been clipped as in those which had.

Animal condition and exercise.—It is apparent that there is often not sufficient attention given to the conditioning of animals. The wastage in animal condition of the artillery and Canadian Engineers especially was very marked, due to none other than the accumulation of fat brought on by lack of real exercise. This wastage was most noticeable after the animals were put to strenuous work in connection with field maneuvers.

Condition, as applied to animals, means thorough bodily muscular fitness for the work required. This much-desired muscular fitness can not be produced by keeping animals in standings with just one hour walking exercise and stall feeding them as one would stock for slaughter. The only way to get animals into condition, under the present circumstances, is sufficient good feed and harness exercise judiciously combined. Harness exercise has many points to recommend it, i. e., animals become used to each other and their drivers, while men become accustomed to handling their teams; so that when called upon in cases of emergency, there is nothing to prevent them from moving off at a moment's notice. I therefore recommend that

where horses are not given sufficient harness work to keep them exercised they be harnessed and worked out gradually for at least two to three hours daily, Sundays included. Such a policy will produce better conditioned animals and the men will become more efficient in the handling of them.

EQUINE DUGOUTS

Equine dugouts as constructed answered the purpose for stable, wind shelter, and more particularly protected the animals from bombs and shells to a great extent, while it is almost impossible for aviators to locate them when such dugouts are camouflaged with canvas colored or with grass tufts.

Further protection against bombs and shells were sand-bags filled with earth and built up in the form of a wall on all four sides of the standing, allowing for exits on both sides.

REPORTS

Reports by veterinary officers to Deputy Assistant Directors of Veterinary Services were rendered weekly on Army Form 2000. On the front of the form is a classification of diseases, showing the total number of animals "in last return," admitted since, cured, transferred sick, died, destroyed, remaining under treatment, etc. On the back of the form is shown the wastage: Died, destroyed, evacuated, missing. With these headings it was possible to keep a most accurate animal-strength return of each unit.

The certificate on the back was given relative to infectious and contagious diseases, especially glanders and mange, while the total number of mange cases under treatment had to be shown.

This report was checked by the mobile veterinary section returns, and rechecked, as far as animal strength was concerned, by the unit's demand for remounts, which was rendered bi-weekly; so there was no possible chance of an error in so far as over or under indenting, when submitting the consolidated remount demand. Its simplicity was the greatest feature, while the casualties of horses and mules were kept separate. In short, the Deputy Assistant Director of Veterinary Services knew exactly where he stood regarding the animal strength of the division, and could check any one particular disease without trouble, and this enabled him to see at a glance just where his services were most urgently needed.

The officer commanding the mobile veterinary section rendered Army Form 2,000 weekly, also a copy of his evacuation roll whenever he evacuated animals to the base. By these two reports the

Deputy Assistant Director of Veterinary Services was able to tell just what minor cases remained at the mobile veterinary sections and which would be returned to the unit within a few days. Such animals were taken into consideration when demanding remounts, by not indenting for others to take their place.

The Deputy Assistant Director of Veterinary Services consolidated all returns rendered to his office and forwarded the same on to the Assistant Director of Veterinary Services, Canadian Corps, who in turn consolidated the divisional reports and sent them on to the Deputy Director of Veterinary Services, Army, and Quartermaster General, Canadians, London.

The Deputy Assistant Director of Veterinary Services rendered a weekly report to the General Officer Commanding of the division, and likewise the Assistant Director of Veterinary Services to the corps commander, giving a synopsis of their work during the preceding week and the general condition of the animals within the division and attached units and corps respectively. They would bring to their commander's notice any irregularity they may have noticed, and also offer suggestions as they saw fit to improve the animal management within any particular unit regarding feeding, watering, stabling, grooming, clipping, bomb and shell protection, etc.

When Assistant Directors of Veterinary Services or Deputy Assistant Directors of Veterinary Services reported adversely on any one particular unit, a copy of the report was always sent to the officer commanding of that unit or formation.

The map location of mobile veterinary sections was always wired by the Deputy Assistant Director of Veterinary Services to the Assistant Director of Veterinary Services and veterinary officers of his division whenever it moved from one location to another, as also his own location whenever the division moved.

All outbreaks of infectious or contagious diseases were reported by wire to the Assistant Director of Veterinary Services, who, after investigating same, notified the Deputy Director of Veterinary Services.

A further monthly return was also rendered to the Assistant Director of Veterinary Services, Corps, by the Deputy Assistant Director of Veterinary Services, Division, for the Quartermaster General, Canadians, information, showing number of animals received, evacuated, died and destroyed, by units. This was necessary so as to permit our Quartermaster General to keep his accounts balanced with the Imperial Remount Department so far as the supply of animals was concerned.

The Canadian Cavalry Brigade operated with the British Cavalry Corps and had its own mobile veterinary section. The veterinary service was administered by the British Cavalry Corps Assistant Director of Veterinary Services, and from what I know very excellent services were rendered. Naturally, the mobile veterinary section had to be extremely mobile, for the Cavalry Corps moved rapidly from place to place; consequently the evacuation of their sick and wounded animals had to be made through any British or Canadian veterinary evacuation station or mobile veterinary section. This was necessary so as not to interfere with their mobility, which was of the uttermost importance.

GAS HORSE RESPIRATORS AND EFFECTS OF GAS ON HORSES

The advisability of horse respirators in gas attacks is a very debatable subject. Personally I am of the opinion that the attempt to adjust respirators to animals during a gas attack, whether it be shell or cloud, is not practicable, as well as being an injustice to the men in charge of the animals.

During a cloud of gas (chlorine) attack at Ypres in 1916 no respirators were adjusted to the animals which came within reach of same, with the results that about 150 were affected and out of which only one animal was destroyed. The balance recovered in from 5 to 15 days and were returned to duty.

In two subsequent shell gas attacks (chlorine) at Vimy Ridge an attempt was made by the drivers to adjust the respirators to their horses, with the result that a number of them (both men and animals) died from gas poisoning, while a number were killed from shell-fire. It is plain that had these drivers adjusted their own respirators and driven their teams to the high ground no casualties would have occurred, either from gas or shell.

In the Ypres gas attack mentioned there is no doubt that a large number of casualties were brought about through transport officers permitting their animals to halt amongst the ruins of that town, which was a ghastly mistake, as gas only settles in such places and therefore they should be avoided.

The effect of chlorine gas on animals is an irritating effect on the lining of the bronchial tubes and respiratory membranes throughout, producing bronchial pneumonia and in the more serious cases lobar pneumonia and gangrene. The symptoms presented in chlorine gas poisoning are prostration, increased respiration, temperature, pulse and an acute cough.

The treatment followed was of a simple nature. Affected animals were kept quiet under cover and fed on mashes and green fodder, while all drinking water was brought to them. Medicinal agents used were morphia, chloral hydrate, and elexor-heroin c.c.

Mustard gas (shell) did not affect animals so extensively as the chlorine. Mustard gas was sent over by shell and mostly by long-range guns, which fire would be directed by enemy aircraft on to our transport lines. Directly this was observed the animals were cut loose and driven from the shelled area, and when Fritz decided he had done all the damage he could the shelling would cease and we would return our animals to their lines, providing of course no shells dropped within the lines, as contact with the ground where a mustard gas shell had dropped would be serious for any animal. The least touch of mustard gas on the animal's body would leave a blister which often led to the sloughing of the skin. The blistered areas were treated locally with astringents, while at outset animals so affected were washed with sodium bicarbonate solution which neutralized the action of the mustard.

EXTENT OF VETERINARY SERVICE

In the different theaters of war the Royal Army Veterinary Corps had a personnel of 1,300 officers, 27,000 other ranks and 6,000 colored men, and over 1,000,000 horses and mules to care for.

I have not touched on diseases and treatment, nor hospital work, for I have no doubt your American Army veterinary officer will go more fully into that phase of our work overseas.

We maintained a veterinary hospital at Le Havre, which was commanded by a Canadian veterinary officer, and with Canadian personnel, but under the administration of the Deputy Director of Veterinary Services, Southern (British). It received animals not only from Canadian formations but from British as well. The efficient work performed at this hospital during the campaign brought forth highly complimentary remarks from the Director of Veterinary Services (General Sir John Moore) and higher commands.

DISPOSAL OF CANADIAN ANIMALS IN FRANCE AND BELGIUM

All Canadian Animals were disposed of to the Belgian Government. The whole of this work was given into my charge as Deputy Assistant Director of Veterinary Services, Canadian Section, General Headquarters, and the handing over of same was satisfactorily completed within three months. A great deal of organization was necessary and many difficulties were encountered but we were able to over-

come them. It was an enormous undertaking on such short notice, for we had to supply four day's forage for each animal, halter and nose-bag.

Consignments were made of types according to demand and sent forward by road and rail to points which were considered the most likely markets. One man to every horse was detailed with an officer in charge. The latter, upon arrival at destination, obtained a receipt from the receiving Belgian representative for all horses, forage, halters (leather) and nose-bags, handed over by him, which was in turn handed into my office at Brussels, thus proving delivery to the Minister of Agriculture by shipments.

At the outset it was difficult to dispose of mules, but once the city commercial people realized the animals' worth for light draft work we could not supply the demand, so that our congenial friend the mule eventually won respect.

The heavy draft animal was greatly in demand, and luckily we were able to dispose of a large proportion of our so-called light draft horses under that classification, while our pack animals were disposed of to mining companies.

The Belgian Cavalry took over the majority of our riding animals.

All the animals handed over were in excellent physical condition.

Dr. E. A. Crossman, in charge of the Federal tuberculosis eradication forces in five of the New England States, gave an address on February 26 at Lawrence, Mass., under the auspices of the City Board of Health. He spoke especially of the increase of tuberculous cows and the advantages of properly pasteurized milk in overcoming the danger of infection in the milk of the afflicted cows.

Dr. Marvin Gregory, who has been in charge of tick eradication work for the Bureau of Animal Industry in the State of Arkansas for several years, resigned at the end of February to engage in dairy farming near Fayetteville, Ark. He had been in the service of the Bureau for nearly sixteen years in various capacities.

Dr. R. J. Donohue has tendered his resignation as Chief, Division of Dairy and Live Stock, Washington State Department of Agriculture, to accept a position with the Carnation Dairy Farms, where he will be connected with the management. Dr. L. C. Pelton of his force will succeed him as Chief.

FURTHER OBSERVATIONS OF TUBERCULIN TESTING AND RETESTING¹

By HENRY W. TURNER

Harrisburg, Pa.

DURING the past two years the Pennsylvania Bureau of Animal Industry has made a number of observations on the application of the tuberculin tests and retests, which was mentioned in a paper before this Association by Marshall and Turner at Kansas City in 1917. As then stated, Dr. S. H. Gilliland had observed that ascending doses of tuberculin administered in the human subject would often cause a reaction for a period of time. Believing this to be due to the sensitization of the body cells, he pointed out that if animals which gave a suspicious reaction to the subcutaneous injection of tuberculin were to receive, 5 to 10 days later, a much larger dose, they would give a decided reaction if tuberculous, or a negative result if nontuberculous.

This observation has been further strengthened by experiments conducted at the Prussia sea quarantine stations. According to results obtained there, cattle previously treated with tuberculin will always react if five times the ordinary dose is administered.

Vallée has also shown that a reaction is obtained when double the dose is administered 36 to 48 hours after a previous injection of tuberculin. In such cases, however, the reactions set in earlier—from the fourth to the ninth hour, and are of shorter duration, hence the necessity of recording post-injection temperatures at 2-hour intervals, beginning immediately after the injection. Malm, Lignieres, Mittau and Lenders report similar experience.

From experiments conducted by the Pennsylvania Bureau of Animal Industry it was observed that the most conclusive results were obtained where the retest was made 7 days after the original test by using a double dose of tuberculin. This may be called the sensitizing method of the subcutaneous tuberculin test.

It is not our practice to retest animals which have given a reaction. In making the final decision of the results of the subcutaneous tests we are often confronted by a number of indecisive temperatures which must be classed as suspicious. This is the first condition where the 7-day retest is indicated. The second and most important

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

retest is in herds where there is a large number of reactors in the original test.

The Federal Bureau of Animal Industry reports an interesting experiment in retesting along these lines. A purebred herd of 66 animals was tested for the first time under supervision, using large doses of tuberculin, and the record of the test showed that 57 reactors were found. Twenty-three of these reactors were selected for a retest in 7 days, by the subcutaneous method, the number subjected to the retest being limited to the supply of tuberculin. The 23 animals reacted the second time within 8 days. Forty-one of the reactors to the original test were slaughtered, and every animal showed well-marked lesions.

The same results have been obtained by the writer, in Pennsylvania, in testing 1,112 animals in 12 different herds, where the infection was from 1 to 70 per cent. The Pennsylvania Bureau of Animal Industry has records of over 1,000 more animals tested in the same way by other State agents.

A few herds have been selected to show the efficiency of the 7-day retest, and the results are given in tabular form. In preparing these tables other interesting points were brought out to which attention will be called later.

The dose of tuberculin was as follows: First or original test, 5 c.c., representing 0.625 c.c. old tuberculin. Second or retest in 7 days, 5 c.c. retest tuberculin, representing 1.25 c.c. old tuberculin.

HERD NO. 1

Herd No. 1 consisted of 43 animals. Results of original test, 27 positive and 16 negative.

TABLE 1—RECORD OF COMPARATIVE TESTS AND DISPOSITION OF ANIMALS
HERD NO. 1

(Showing 16 animals negative and 3 positive to original test)

ANIMAL NO.	11	15	21	22	25	42	28	31	34	44	37	10	4	7	23	19	20	41	38
Subcutaneous test.....	N	N	N	N	N	N	N	N	N	N	N	N	P	P	P	N	N	N	N
Retest Subcutaneous 7 days later....	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	N	N	N	N
Postmortem.....	L	L	V	L	N	L	L	N	N	V	L	L	L	G	G	G	N	N	N
Disposition of carcass.....	F	F	F	F	F	F	F	F	F	F	F	F	N	C	C	N	C		

Nos. 11, 15, 22, 25, 42, 28, 44, 37 and 10 showed slight but definite lesions.

Explanation of symbols: N, negative; P, positive; NVL, no visible lesions; GEN, generalized; L, localized; F, food; C, condemned.

Sixty-three (63) per cent of the entire herd reacted to the original subcutaneous test. On postmortem all showed lesions, 3 being generalized. The 16 negative animals were retested in 7 days;

12 of them, or 75 per cent, reacted. On postmortem 8 showed lesions, 4 no visible lesions.

As a result of the 7-day retest, 28 per cent of the entire herd (12 animals) reacted to this test but failed to react to the original test.

HERD NO. 2

Herd No. 2 consisted of 40 grade animals. Results of the original test, 17 positive and 23 negative.

TABLE 2—RECORD OF COMPARATIVE TESTS AND DISPOSITION OF ANIMALS
HERD NO. 2

(Showing 6 animals positive to the retest but negative to the original test)

ANIMAL No. —	2	10	25	30	31	40	(36 Positive to Both Tests)
Subcutaneous test.....	N	N	N	N	N	N	P
Retest subcutaneous 7 days later....	P	P	P	P	P	P	P
Postmortem.....	L	L	L	L	L	L	Generalized
Disposition of carcass.....	F	F	F	F	F	F	Condemned

Nos. 2, 10, 25, 30, 31 and 40 showed slight but definite lesions.

Forty-two per cent of this entire herd, or 17 animals, reacted to the original test. On postmortem all showed lesions, 4 of them being generalized. The 23 negative animals were retested in 7 days; 6 of them, or 26 per cent, reacted, all showing lesions on postmortem.

Fifteen per cent of the animals in the original subcutaneous test reacted to the 7-day retest. They had been negative to the original test.

HERD NO. 3

Herd No. 3 consisted of 84 grade animals. Results of original test, 7 positive, 1 suspicious, and 76 negative.

TABLE 3—RECORD OF COMPARATIVE TESTS AND DISPOSITION OF ANIMALS,
HERD NO. 3

(Showing the reacting and suspicious animals in this herd)

ANIMAL No. —	15	146	155	7	113	78	108	8	141	157
Subcutaneous test.....	P	P	P	P	P	P	P	N	N	S
Retest subcutaneous 7 days later....	P	P	P	P	P	P	N	P	P	N
Postmortem.....	L	L	L	E	E	NVL	NVL	L	L	
Disposition of carcass.....	F	F	F	N	N	F	F	F	F	

Seventy-four of the seventy-six negative to the original test were negative to retest, and are not shown.

Nine per cent of the herd (7 animals) reacted to original test. On postmortem 5 showed lesions, 2 no visible lesions. The 76 negative and 1 suspicious animal were retested in 7 days, 2 of them reacting, and on postmortem both showed lesions.

Two per cent of the animals in the original subcutaneous test reacted to the 7-day retest. They had been negative to the original test.

The one suspicious animal to the original test (No. 157) was negative to the ophthalmic and retest. In a test made a year later it reacted, and on postmortem showed enlarged and caseous bronchial and mediastinal glands. This animal should have been destroyed on the original test.

HERD NO. 4

Herd No. 4 consisted of 55 grade animals. Result of original test, 40 positive, 2 suspicious and 13 negative.

TABLE NO. 4—RECORD OF COMPARATIVE TESTS AND DISPOSITION OF ANIMALS, HERD NO. 4

(Showing the reactors to the retest which were negative and suspicious to the original test, and the nine with generalized lesions on postmortem)

ANIMAL No. —	1	11	25	32	34	35	42	9	48	4	14	19	21	26	30	39	40	44
Subcutaneous test.....	N	N	N	N	N	N	N	S	S	P	P	P	P	P	P	P	P	P
Retest subcutaneous 7 days later.....	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Postmortem.....	L	L	L	L	L	L	V	L	L	E	N	E	E	E	E	E	E	E
Disposition of carcass.....	F	F	F	F	F	F	F	F	F	C	C	C	C	C	C	C	C	C

Nos. 4, 14, 19, 21, 26, 30, 39, 40 and 44 were positive to both tests and on postmortem showed generalized lesions.

Seventy-two per cent of the herd (40 animals) reacted to original test. On postmortem all showed lesions, 9 being generalized. The 13 negative and 2 suspicious animals were retested 7 days later; 9 of them, or 60 per cent, reacted. On postmortem all showed lesions but one.

Sixteen per cent of the animals in the original subcutaneous test reacted to the 7-day retest. They had been negative to the original test.

SUMMARY OF TABLES

To summarize these tables, 222 animals were tested subcutaneously; 40 per cent reacted to the original test. There were 128 negative and 3 suspicious animals retested in 7 days; 20 per cent of them reacted to this retest.

Twelve per cent of the animals tested failed to react to the original test, but did react to the retest 7 days later.

Some interesting points were brought out in compiling these tables, one of which seems to refute the generally accepted opinion that advanced cases of tuberculosis do not always react to the tuberculin test. We found that all of the generalized cases had

reacted to the original test as well as the 7-day retest. This has been our invariable experience in herds which have been tested in this manner, with the exception of one animal.

Many of the animals which were negative to the original test, but reacted to the 7-day retest, on postmortem showed slight but definite lesions.

Generalized cases appear to react consistently, but the incubative or slightly infected cases do not always react but often require sensitization before giving a definite reaction.

An opportunity was recently afforded for making a 60-day retest in conjunction with the inspectors of the Federal Bureau of Animal Industry on 2 herds composed of 214 animals. In the original subcutaneous test 90 animals, or 42 per cent of the entire number tested, gave reactions, and on postmortem all showed lesions except one. The 124 negative and suspicious animals were retested in 60 days. Forty-six of them, or 37 per cent, reacted, and on postmortem all showed lesions. There were 39 animals which showed generalized lesions on postmortem, and all of them had reacted to the original test. In these herds 21 per cent of the animals in the initial subcutaneous test failed to react but reacted to the 60-day retest.

These results favor the early retest, as it demonstrated that 78 healthy animals had been exposed for 60 days to infection from 46 animals which were found on retest to be tuberculous, a condition which could have been ascertained in 7 days.

The efficiency of the 7-day retest has been clearly demonstrated in our work. It shortens the time of exposure to infection and is more economical and convenient to the owner, which is a very important phase of tuberculosis eradication.

CONCLUSIONS

Where the 7-day retest is indicated:

1. When animals have given unsatisfactory temperature measurements to the subcutaneous test.
2. In herds where a large percentage of reactors to the subcutaneous test have been found.
3. In herds where on postmortem examination the reactors to the initial test show only slight lesions, indicating that the spreader has not been detected.

HEREDITY AS EXPRESSED BY OUR STALLION REGISTRATION LAWS¹

By W. H. WELCH

Lexington, Ill.

"LIKE produces like, or the likeness of some ancestor." This is a true maxim handed down through the ages. It is particularly applicable to animal life, and refers more specifically to anatomical outlines, color, markings, conformation, gait, individuality, etc. It is this well demonstrated principle of inherent prepotency that constantly leads progressive breeders to seek their ideals as nearly as possible in their foundation stock. It is the law of nature on which the fundamental basis of constructive scientific breeding is builded, whence through the careful selection of type, conformation, quality, and the constant culling of undesirables, we build toward that standard of perfection which we consider ideal.

"Like father, like son" is also an axiom of ancient origin oftenest applied to the human family in reference to traits of character, inherited instincts, etc. As a formula for successful live-stock breeding its wisdom finds expression and daily application in the hands of the progressive stockman, who makes a careful and painstaking selection of the sire intended for service on his high-class females, knowing that by the intelligent use of a very superior sire he will be enabled to improve measurably the standard of his herd. Its practical culmination is found in the oft-repeated statement, "A sire represents one-half the entire herd," and fabulous expenditures have been made for sires capable of adding fame and quality to an already high-class aggregation of females.

The old admonition, "We should marry our opposites," is founded on the theory of equalization and the law of compromise, reasoning that in the mating of a man and a woman both of similar type and temperament certain strong qualities and characteristics would be so intensified in their children as to be decidedly objectionable, while in the offspring of those couples possessing opposite types (their ancestral inheritance being equal) there would result a mutual blending of all the natural instincts and characteristics peculiar to each. In animal life it is this theory that leads breeders to mate approved animals of similar type, and to seek the opposite in conformation at points wherein improvement is desired.

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

"The survival of the fittest" by the selection of the finest and best specimens for seed stock has been a proverbial procedure from time immemorial. The farmer gathers from his corn the most perfect of the ears; the horticulturist grafts his finest fruits; the breeders selects his most desirable females and mates them with the best obtainable sire. Thus by the continued propagation of the choicest types, ideal specimens have been produced that have commanded the admiration of the world and set a monetary value on those certain individuals reaching into the thousands of dollars.

These are the results of intelligent constructive breeding. They are the products of the continued mating of a certain type of animal throughout several generations until that type has assumed a fixed standard of excellence. Animals bred after this fashion are remarkably prepotent, transmitting their inherent characteristics to a marvelous degree. In some instances such a sire has popularized an entire breed, and it is a notable fact that all the improvement in the characteristics peculiar to each of the different breeds has been accomplished by the intelligent use of great sires crossed on the proper type of females, dictated by a master mind.

I have attempted to indicate how through the careful and intelligent selection of a standardized type of animal continued progress may be made and the idea ultimately approached with great certainty, although the goal of perfection may never be reached. Retrogression, however, is far easier. Defective, weak and faulty conformations are fully as transmissible, aye, more heritable, than is the ideal or perfect standard, because in the ancestral inheritance of most animals there have been more defective conformations than perfect ones. As for "every effect there is a cause," so we find that for every defect there is a reason. Blemishes are largely the results of the efforts of nature to strengthen and repair weak and faulty structures, and in the heritability of blemishes these structural weaknesses must be given due consideration as being largely the primary causative factor in their production.

Let me also add that while this paper deals with the problem of the transmissibility of disease and unsoundness solely in its relationship to the stallion, I desire throughout its entire length to incriminate equally the dam on at least a fifty-fifty basis, and no reference is made to the stallion but what I desire shall apply with equal force to her. Should we mate a single-hocked dam with a stallion possessing a perfectly acceptable hind leg, justice demands that we should not hold the stallion entirely responsible for a result.

ant crooked hind leg on the foal. Our stallion laws, however, do not contemplate any action looking toward the elimination of unsound mares offered for service, so that any hoped-for improvement in the character of horses raised must be reached through the agency of the stallion kept for public service. How important, then, that in our legislation we place on our statutes stallion laws that will materially assist in the production of a better and a more valuable race of horses; laws that will cause the farmer to use the better type of stallion for a sire; laws that will exclude the common and inferior side; laws that will eliminate, or at least greatly lessen, the blemishes in future generations of horses; laws that will make for the betterment of the horse business in general.

Ask the earnest advocate of our present stallion laws if they have materially assisted in producing a better class of horses, and he cannot truthfully answer you in the affirmative. He points with pride, however, to the fact that they have been instrumental in exposing a great many stallions standing on bogus and fraudulent pedigrees, and claims that because of their enactment the percentage of grade sires standing for public service has been greatly lessened. I challenge the assertion that the present laws have been in any great manner responsible for eliminating the grade sire from service. Stockmen are fast being educated to the great value of using purebred sires not only on their mares but on their cows, their sows and their ewes, and there has been a greater percentage of grade and scrub bulls, boars and bucks eliminated from the breeding ranks than stallions. Place the right kind of a purebred stallion in a community, and the grade soon ceases to be a menace. However, these laws have been of real benefit, in that they have caused the farmer to think and to study these breeding problems. As a result he has learned to discriminate, and today is demanding a better and sounder stallion than ever before.

With the desire of putting the horse business on a "sounder" basis, 26 of our States have enacted "stallion registration laws" which, it was hoped, would tend to improve the character of the horses raised and greatly lessen or entirely eliminate certain blemishes and unsoundnesses in the future generations of equines. Under these laws certain blemishes, unsoundnesses and diseases are declared heritable and a stallion so affected is refused a license to stand for public service. Doubtless it was reasoned, inasmuch as these unsoundnesses were considered to be of a transmissible nature, that by eliminating the unsound sire from public service a conse-

quent lessening of blemishes would be apparent in the following generations. It is worthy of note, however, that in none of the 26 States was any consideration given to the unsound mare, but that all anticipated improvement was to be attained by eliminating the unsound stallion from the breeding ranks.

It is of further interest that in but 6 of the States was any attention devoted to faulty or weak conformations in the sire as being heritable features that might predispose their subsequent offspring to unsoundness. That a great diversity of opinion exists regarding the heritability of various unsoundnesses is also evident by a perusal of the laws which were enacted by the different States. An unsoundness that may disqualify a stallion for service in one State may prove no barrier to his receiving a license should he be removed to another. The laws of 5 of our States do not disqualify any stallion, but require that his blemish or unsoundness of whatsoever nature be enumerated in his license and posted on the door of his stall, where all prospective patrons may inspect it. This leaves 21 States wherein stallions may be disqualified because of unsoundness or blemish. Yet a unanimity of opinion is not recorded on a single disease. Seventeen States, however, are united in the opinion that periodic ophthalmia, bone spavin, ringbone, and curb when accompanied by curby conformation, are heritable, and stallions so affected are barred from public service. A complete list of unsoundnesses mentioned, some of which may be considered heritable by one State and in others its victim prove entirely acceptable, are enumerated as follows:

Periodic ophthalmia; cataract; glaucoma; amaurosis; glass eye.

Bone spavin; ringbone; bog spavin; sidebone.

Curb, when accompanied by a curby conformation of hock.

Laryngeal hemiplegia; roaring; whistling.

Chorea; stringhalt; crampiness; shivering.

Heaves, or broken wind.

Navicular disease; laminitis; canker of foot.

Melanosis; osteoporosis; cryptorchidy.

Venereal diseases; *maladie du coit* (dourine); urethral gleet; coital exanthema.

Glanders and farcy.

Mange; vicious disposition.

Weak or faulty conformation, or any serious defect liable to be transmitted to offspring.

It is worthy of note that this list includes almost every unsound-

ness of a chronic nature to which the equine flesh is heir. How the "dummy," the "bobby," and the animal affected with fistulous withers or poll evil ever escaped is difficult to surmise. It would seem that quarantine regulations would properly and adequately cover animals affected with any of the venereal diseases, glanders, mange, and all other contagious and infectious diseases, and that any mention of them in a stallion law would be entirely superfluous. All will admit their transmissibility by contact, and any discussion as to heredity is unnecessary.

Let us pass to a consideration of those different diseases declared as heritable by these various enactments.

PERIODIC OPHTHALMIA

In 17 out of the 26 States possessing stallion laws periodic ophthalmia is considered as heritable and constitutes a legal bar to receiving a license.

In the light of recent investigation, the results of which must be accepted by all fair-minded veterinarians, the etiological factor in the production of this disease has been conclusively proved to be bacterial.¹ The isolation of the specific bacillus, the reproduction of the disease by inoculation of healthy eyes and certain other indisputable facts stamp this as true beyond any question.

We must all acknowledge that periodic ophthalmia manifests no preference or partiality in the selection of its victims, being as likely to attack the best appearing eye in the herd as it is the small, inferior-looking eye that we have always viewed with a certain degree of suspicion. We further agree that when one eye in a herd has been attacked other cases are almost certain to follow, irrespective of any blood relationship that may exist between the victims, and that within a few months following its appearance a liberal percentage of horses on that farm will have lost the vision of one or both eyes ere it ceases its ravages. We usually find it developing some weeks or months following an outbreak of influenza, distemper or other inflammatory disease affecting the respiratory tract, as a sequel of those disorders.

We are further impressed of its non-transmissibility by the fact that foals sired by a stallion after he himself has fallen a victim to the disease are no more susceptible to attack than are those which he sired previously to becoming affected. To the impartial mind it seems scarcely conceivable that eyes which are perfect in appearance

¹ *Dalling in The Veterinary Journal*, London, vol. 75, No. 1.

may remain sound until the animal has reached maturity, or even for 20 or more years, and then succumb to the ravages of a heritable malady. We must in the face of all these facts accept this as a constitutional disease and not a transmissible or heritable unsoundness.

CURB

In the same 17 States a curb, only when associated with a curby conformation of the hock, is declared transmissible and a stallion thus blemished is disqualified.

A curb may be present on any type of hock other than one of a curby conformation and will in no way prejudice the stallion's right to a license. No one, I am sure, will dispute the justice of this provision, because the best shaped hock in the world is liable to become curbed. In none of these States, however, will the curby conformation alone disqualify him for public service. He must in addition to the curby conformation be actually possessed of a curb. Reasoning therefrom, we deduce the theory that a curb is not transmissible when situated on a hock of otherwise good conformation; that it is transmissible only when associated with a curby conformation; that the curby conformation which we all know predisposes the animal to the development of a curb is of no consequence; and that a stallion is a menace to the breeding interests only during such time as he is actually possessed of a curb. The curby-hocked stallion with the sled-runner legs may stand for public service until such time as he may actually develop a curb, when the law disqualifies him. Then by a successful treatment the curb may be reduced and the animal once more becomes eligible to a license. Are there any who affirm that a greater percentage of curbs would exist among his offspring sired during the time he was condemned as being possessed of a curb than before or after that time, when he was technically free from that blemish?

Inferentially these laws say that even though a stallion possesses a curby conformation his offspring will be sound so long as he himself does not actually possess a curb, but the moment that he develops a curb on that curby conformation he at once becomes a menace to the breeding interests and is disqualified for service. In other words, the blemish is heritable; the predisposing causes are of no consequence. What inconsistency! If our laws referring to curb do not contemplate the eliminating of stallions possessing a curby or faulty conformation of hock, regardless of the actual

presence or absence of the curb, then we have made no progress in the elimination of curbs from the future generations of the equine race, and that section of the law might as well never have been written.

BONE SPAVIN AND BOG SPAVIN

Seventeen States agree that bone spavin is a heritable blemish, while 12 assert that bog spavin is a serious menace to the breeding interests.

There is no disputing the fact that weak and faulty conformations are responsible for nine-tenths of the entire group of hock lamenesses and blemishes. A too-crooked hock is without doubt the most palpable defect with which we have to contend in the breeding business, as it predisposes the animal not only to the early development of bone spavin, bog spavin, thoroughpins and curb, but may well be considered an accomplice in the production of ringbone as well. Added to this is the hind leg that is too straight, which, while not so easily curbed, is a strong factor in the etiology of both bone spavin and bogs.

Faulty or defective conformation of hock should disqualify any stallion, even though he cannot technically be classed as unsound, because among his get there will be found just as many hock blemishes as though he himself were actually so diseased. Let us eliminate the stallion with the ill-shaped hock from public service, and in a generation we shall have done more toward the eradication of bone spavin, bog spavins, curbs, thoroughpins, ringbones and other kindred ailments than can be accomplished in a century of the present plan.

RINGBONE

There are certain heritable conformations of the pastern that predispose animals to the development of ringbone. The too-long pastern that stands too straight and the coon-footed or too-crooked pastern are transmissible defects that should disqualify a stallion for receiving a license more readily than should the actual presence of a ringbone on the pastern of good conformation, because those defects are predisposing causes that he will transmit to his get, and will contribute very materially to the development of ringbone. On the other hand, the stallion possessing a good conformation at those points will transmit that quality, and unless his offspring meet with some extraneous cause it will never develop ringbone. Seventeen States, however, see in the blemish alone, without regard

to the conformation accompanying it, sufficient evidence of a future progenitor of ringboned foals and accordingly refuse him a license.

ROARING

What accurate knowledge do we possess that justifies us in placing roaring or whistling in the category of transmissible or heritable diseases? Is the paralysis producing it not 90 per cent the sequel of the common inflammatory respiratory diseases? Do we not observe it among the progeny of all stallions with almost identical frequency? True, I grant you, it is most commonly found existing in the short, thick-necked, narrow-jawed animal, yet no conformation can be declared exempt from it. A stallion remains sound for many years, when he suddenly becomes a confirmed roarer; yet I believe that all will subscribe to the statement that of his foals begotten following that period no greater percentage will develop into roarers than will be found among those which he sired previous to the time of his becoming affected.

Then again, a stallion that roars may be entirely relieved of that condition by a successful laryngeal operation, and among all the laws of the different States, in not a single one of them is it possible to disqualify him, even though it be positively known that he has been surgically relieved. The act of roaring is itself the condemning feature without reference to the diseased organ that produces the offending noise.

If heredity plays an important part in the production of this unsoundness, why should a large percentage of animals delay until long after maturity and then require some extraneous influence to cause its development? If it is heritable to the extent of being a menace to the breeding interests, why are not a greater percentage of our draft horses roarers, since 50 per cent or more of all draft stallions located in the Middle West that reach the age of 10 or more years are confirmed roarers, a ratio that has held good for more than 30 years?

To my mind, any State is doing the horse business a great injury when it disqualifies any desirable stallion on account of being a roarer, yet 15 States have legislated and banished him from their borders.

SIDEBONES

Stallions possessing sidebones are made unwelcome guests by 15 different States.

Traumatism or other extraneous influence may cause the develop-

ment of sidebone on the very best of conformations, yet all will agree, I believe, that the too-straight or too-crooked pastern and the narrow, contracted, or the too-flat foot are heritable defects that predispose toward its development. On the other hand, I believe that none will affirm that the stallion with a good conformation at that point, possessed of a sidebone caused by external traumatism, is necessarily destined to be the progenitor of a family in which sidebones predominate.

HEAVES

Heaves offends the stallion laws of 7 different States, and animals so affected cannot secure a license to stand for public service.

While any horse is subject to its ravages, the greater percentage of cases are found in those of a certain type and conformation, the compact, full-made animal, possessed of what we term a good middle and a ravenous appetite. They are always what we call good feeders, capable of withstanding hard usage and still retaining good flesh. In fact, in all classes of horses this is the type most sought, as it is considered the trade-mark of efficiency and the ideal conformation, whether in the show-ring, the markets, or on the turf.

It would seem a rational statement that the more heritable a disease the younger we might expect its appearance in the offspring of a stallion so tainted. Here is a pathological condition, declared heritable, but never occurring in other than matured horses; a disease that is entirely due to mismanagement on the part of the user or caretaker and one that is as easily prevented as it is produced. I fail to see how a fair-minded veterinarian can for a single moment condemn it as being of a heritable nature, and for us to stand idly by and permit a law to be enacted disqualifying a stallion solely because he is affected with "heaves" is a serious reflection on us and as unreasonable a procedure as were we to bar an extra heavy milking cow from the breeding or dairy herd simply because she had previously been affected with parturient paresis.

OTHER UNSOUNDNESSES

Proceeding briefly for lack of time, are chorea, stringhalt, crampiness, shivering and those allied conditions of such a heritable nature as to necessitate disqualifying an extra high-class stallion and leaving an inferior or common animal that happens to be sound as the only available stallion for patronage? Thirteen States, some of which are sadly lacking in good stallions, have said "yes," while a

majority of the best horse-producing States have passed them by as being of a negligible character.

Regardless of any transmissible feature, which it may or may not possess, is melanosis of sufficient importance that we should banish a good stallion so affected from the breeding ranks? Ten States, some of which are in need of good stallions, have declared that it is. Is navicular disease a hereditary trouble? Eight States undoubtedly believe so.

Can laminitis or canker of the foot be transmitted from parent to offspring? One State, apparently, does not care to assume the risk, while two States, as widely separated as space will permit, join in legislating against osteoporosis.

Thus we see widely diversified opinions recorded under the different laws regarding the transmissibility of these various blemishes and unsoundnesses. It is regrettable that they are not more uniform in character at least, since it is not easily explained to the laity how an unsoundness can be transmissible in one State and not in another. However, I can see no hope for improvement under existing conditions, either as to producing a better class of horses or as to reducing the number of blemishes on future animals. In only 6 out of the 26 States is it possible to disqualify a stallion until he actually possesses an offending blemish. If that unsoundness is heritable, then he himself has beyond question possessed that taint since birth and has already transmitted that heritable taint to all offspring sired previously to his condemnation.

Doubtless there are those who do not concur in what I have said, and with you I have no quarrel. I do not desire to advocate and sanction the licensing of all sorts of stallions afflicted with all sorts of blemishes and unsoundnesses. From an administrative standpoint, if for no other reason, I know what would be the psychological effect upon the laity. There are unsound stallions so superior, however, that their disqualification is a calamity. There are literally thousands of sound stallions that should be refused a license. It is a deplorable fact that our present laws have eliminated from the breeding ranks many excellent stallions of the proper conformation, type and weight, stallions that even though possessed of a slight blemish which they might or might not transmit would still be a positive benefit to the community; and have left in their place, simply because he was not unsound, as the only available animal for service, an inferior, common, no-account

“stud-horse” that should never have been born in the first place, much less permitted to exercise the privileges of a sire. In many communities, therefore, these laws have been the means of a step backward in the horse business instead of an aid to progress.

Stallion laws should be enacted with but one object in view—the production of a better race of horses. The premises on which our present laws are based are fundamentally wrong. They are founded entirely on the hypothesis that certain blemishes and unsoundnesses are transmissible from parent to offspring, but inferentially one gathers that the anomalies inviting such unsoundness are not heritable. The reverse of this is true. The direct transmission of any disease from parent to offspring is unproved. The weak conformations, the faulty defects, the atonic weaknesses that invite and predispose the animal to the development of such blemishes, are the taint that is transmitted with unfailing constancy, and any law that takes into consideration the blemish without duly reckoning with the structural weaknesses as the predisposing cause of that blemish will increase rather than diminish unsoundness in the generations of equines that are to come.

The transmission of these various blemishes by stallions possessed of a good conformation at point of blemish is of a negligible character as compared with those whose conformation is weak and faulty, even though the latter must technically be passed as sound. Blemishes and unsoundnesses are not extensively found among the progeny of blemished sires, unless there be also present a transmissible faulty conformation. Many stallions whose names are household words have been thus severely handicapped in the extent of their services and have lived long enough to demonstrate to the world that they did not transmit their unsoundness. Had Wisconsin possessed her stallion law 30 years ago, Pilot Medium, with his two large bone spavins, would have been disqualified and we should never have heard of Peter the Great or any other of his illustrious descendants that have made more turf history in the past 15 years than any other family. Had California possessed her law, the get of the notorious roarer Ormonde would never have faced a starter. Had Kentucky enacted such a law 50 years ago her blue-grass regions would have been less famous, for she would have lost, aye, this nation would have lost, perhaps the most celebrated sire ever within our borders, old Lexington, blind with periodic ophthalmia from a 4-year-old. International prize-winners have been bred from sire and dam both of whom were blemished. Case on case, of sire

after sire, might be cited, whose get have made history in the showing and on the turf, who today could not return and stand for public service in the States that they helped make famous.

We need a law founded on type, conformation and individuality as well as unsoundness; a law that will call attention and give praise to a particularly high-class stallion, and at the same time disqualify the common and inferior animal even though he be sound; a law that will plainly state if an animal is sound, and if not sound will explicitly state of what unsoundness he is possessed and as to whether or not it may reasonably be considered transmissible. Coupled with this, we need an official examiner or an examining board in each State, who will fearlessly do their duty. The placing of this duty in the hands of the local veterinarian has proved neither to the best interests of the law nor of the veterinarian, and he will gladly welcome the change.

But you ask, "Is it possible to frame a law that will do justice to all concerned with the ultimate result of producing a better and a sounder race of horses?" I believe that it is. Two years ago, as chairman of a committee appointed for the purpose, I presented the subject before the Illinois State Veterinary Medical Association, advocating an examining board in each county who should judge stallions by a score-card, those capable of scoring 90 or more points to be licensed as "State approved stallions," and those falling below 65 points to be refused a license. Since that time, however, I have come into possession of the stallion registration law of Saskatchewan, which is so complete and along the same lines that I feel that with a few changes it could be profitably adopted by our States. Briefly, it provides for the grading of stallions by an official examiner into classes A, B, C and D, according to their individual merits.

Class A is as follows: "Said stallion has been examined by official examiner and found to be up to standard of conformation, type and quality desirable for stud service, free from any unsoundness due to defective conformation, or structural weaknesses, and is highly recommended for breeding service in any part of Saskatchewan."

Class B is stated to be of fair conformation and free from hereditary unsoundness.

Class C is unsound and such unsoundness is noted in body of license.

Class D refers to grades.

I earnestly commend this law for your investigation.

Veterinarians are today doing a noble work along the lines of

sanitation, the conservation of health and the saving of life and usefulness of all species of the animal kingdom, but no phase of their highly specialized and scientific work is of more importance at this time than their aid in the production of a better and a sounder class of horses.

The unprecedentedly rapid increase in land values forever forbids the future production of the common or inferior horse except at a financial loss. Grain rations can never again reach the low level of prices scheduled during the nineties. The \$300 to \$500 animal must be our aim if we are to continue remunerative horse production.

Fully 50 per cent of our stallions today should be unsexed and not permitted to perpetuate their miserable defects and faulty conformations on future generations. We have three times as many stallions as we really need. We really need three times better ones. We must advocate the doctrine of more stallion castration and less stallion registration. Added to this we need a State or Federal subsidy for our best stallions, so that our better individuals of correct type and conformation may be preserved to the breeding industry and placed in communities where they may do the most good. Then when we shall have educated the farmer to the fact that the dam who for 11 months carries the foal, and whose blood nourishes every atom in its anatomy, should share one-half of the responsibility in the production of an ill-shaped offspring; when, because of their inferiority, we shall have eliminated from our breeding ranks fully 50 per cent of our mares, and a like percentage of our stallions, then will we indeed have been instrumental in the production of a better race of horses, and the real mission of a stallion registration law have been accomplished.

Dr. George M. Potter, formerly in the Pathological Division of the Bureau of Animal Industry in Washington, D. C., and later in charge of educational hog cholera work for the Bureau in Kansas, is now conducting a veterinary practice in Hammond, La., where we understand the doctor is doing well. With the exception of about one year, Dr. Potter had been with the Bureau since 1906.

Dr. H. L. Duell, who entered the service of the Bureau of Animal Industry in April, 1911, and who was assigned to hog cholera control work in 1914, resigned his position February 29, 1920.

THE BACTERIOLOGY OF THE REPRODUCTIVE ORGANS OF THE COW AND ITS RELATION TO THAT OF THE MECONIUM OF THE CALF¹

By WARD GILTNER and S. G. BANDEEN

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IN the past, efforts to determine the specific microbic etiological factor of a number of diseases have been rendered futile, at least for an uncomfortable period, because of the ignorance of the bacteriologist of the normal variations in the microflora of the several regions of the animal body. *Bacillus icteroides* of yellow fever, *B. cholerae suis* of hog cholera, bipolar staining bacteria, pneumonia-like diplococci, buccal amebae and many others have led investigators down blind alleys. Even in bovine infectious abortion Evans has reported abortion-like bacteria in the milk, a fact which well might annoy the unwary investigator. A complete knowledge of the microflora of the bovine reproductive organs seems to us essential to a full understanding of the problems involved in a study of the diseases involving those organs.

For the past ten years we have concerned ourselves with this problem, without, however, exhausting its possibilities. Others have also seen the importance of such studies. Considering the udder in its proper light as one of the reproductive organs, we have directed studies of its flora from the standpoint of abortion disease. The results in so far as apparently normal cattle are concerned may be summarized as follows:

1. The normal bacterial flora of the udder is comprised of microflora belonging largely to two types, the micrococci and the staphylococci, varying in pigment production, fermentation reactions, hemolytic power, and to other tests to which they have been subjected.

2. The comparison of the organisms isolated from the udder with those isolated from the primary genital organs reveals no close similarity.

Therefore we are not led to believe that ordinarily there is a migration of organism from the primary genital organs to the udder or vice versa, but it is urged that more work be done along this line.

Extensive studies on the bacterial flora of the uterus and vagina

¹ Paper presented at the Fifty-Sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

of cattle have been made in our laboratory. In one series of 30 cattle (abortion disease present), swabs were made from the vaginas of 30 and from the uteri of 23. Thirty-four organisms were isolated from the vaginas and 24 from the uteri. There were 52 different organisms isolated, only 5 of which occurred in both uterus and vagina. There were no two cows which showed an identical flora in either uterus or vagina, and there was very little similarity in the bacterial flora of any two cows, although they were all on the same premises. Swabs were made from the sheaths of several bulls, and of the 20 organisms isolated all but 1 were also found in the uterus and vagina of cows. There is, thus, evidence that there is a general relationship between the flora of the generative mucosæ of the two sexes.

Of the organisms found there were, of the four genera according to Migula: *Bacterium*, 22; *Bacillus*, 3; *Micrococcus*, 11; *Streptococcus*, 4. In the course of the work it was found that many of the bacteria required a neutral medium and could not grow on a medium at all acid to phenolphthalein.

Mohler and Traum studied the flora of the vaginas of 9 cattle. The abortion bacillus was not found. The most frequently observed organisms included *Bacillus coli*, *B. subtilis*, *Streptococcus pyogenes albus*, *S. pyogenes bovis*, *Pseudomonas pyocyanea*, *Bacillus mesentericus*, *B. vulgaris*, *Cladothrix nonliquefaciens*, and *Sarcina subflava*, with a much larger number of undetermined species. They state that while there was a certain uniformity in the species found, there were many types that were transient, the result of contamination through the vulva, and all were not present in every case.

The bacterial flora of the bovine reproductive organs under abnormal conditions centers about abortion disease. Little is to be gained by a review of the literature prior to the general acceptance of Bang's efforts to incriminate *Bacterium abortus* as the etiologic factor in epizootic abortion. In outbreaks of abortion Bang's bacillus is generally found in the pregnant uterus, fetal membranes, fetus, and in the udder.

Schroeder and Cotton injected cultures of the abortion bacillus into non-pregnant uteri of cows and found that the organisms disappeared in a few days. This corresponds with our experience. In fact, we have failed to isolate the abortion bacillus when introduced into the vagina or sheath generally after 24 hours. An examination of the uterine discharges of aborting cows by Schroeder and Cotton shows that the abortion bacillus disappears after two or three weeks,

the maximum being 51 days. The same investigators and also Cooledge have noted the persistence of *Bacterium abortus* in the udder quite indefinitely after it becomes established.

Stockman and Theobald Smith and Buck and Creech, as reported by Cotton, have found spirilla or vibrios (*Vibrio fetus*, Smith) in the uterine exudate presumably standing in etiologic relation to abortion. Good reports finding *Staphylococcus pyogenes aureus* in the uterus as well as fetal membranes and fetus of an aborting cow. Moussu and others are of the opinion that certain strains of colon organisms will cause abortion. Uterine tuberculosis is noted by McFadyean and Stockman and by Williams. Egglink, reported by Ward, records a bacteriological investigation of 20 cases of endometritis with the following results: Tubercle bacilli, 2; *Bacillus pyogenes*, 14; streptococcus, 12; colon bacillus, 6; staphylococcus, 5; *Bacillus proteus*, 3; *B. subtilis*, 1.

In 11 cases reported by Wall there occurred: Streptococcus, 7; colon bacillus, 5; *Bacillus pyogenes*, 3; anaerobic bacillus (in one of these bacillus of malignant edema), 2; necrosis bacillus, 1; proteus bacillus, 1.

Cystic ovaries have been studied bacteriologically to a limited extent. Fitch reports that one ovary gave a pure culture of a long chain streptococcus. *Bacillus coli* was found in several and *Micrococcus pyogenes* was found twice. We have failed to find the abortion bacillus or its antibodies in ovarian cystic fluids.

The work of Hagan shows that there is a relation between the organisms found in the utero-chorionic space and those found in the amniotic fluid and the meconium. In 16 pregnant cows the utero-chorionic space gave cultures in 14 cases or 87 per cent; the fetal fluids gave cultures in 5 cases or 33 per cent, and in 4 of the 5 cases the cultures corresponded. Hagan studied the meconium in 2 herds. The meconia from 6 calves in 1 herd were all sterile. In the second herd 3 were sterile while the other 5 gave growths as follows: Three were colon bacilli, 1 was streptococcus and 1 was mixed streptococcus and staphylococcus.

Schroeder and Cotton have found that aborted fetuses harbor Bang's bacillus in the stomach, liver, intestine, lymph glands, spleen and blood, and that in all cases in which the fetus was infected the organism was found in the utero-chorionic space. In our laboratory Huddleson examined 9 aborted fetuses. *Bacterium abortus* was isolated from the stomach contents of 8. In only one instance was the organism isolated from the fetal blood, spleen, kidney and

liver. Williams states that Bang's bacillus is frequently found in the stomach and blood or glands of the fetus but never in the rest of the alimentary tract. This indicates to him that the primary fetal invasion is through the chorion into the amniotic fluid. Smith found his *Vibrio fetus* alone and with other organisms (colon, *Bacterium abortus*, *Bacillus pyogenes*, etc.) in the fourth stomach, rectum, lung, spleen, liver and kidneys of fetuses.

The work which we wish to report on at this time in more detail had as its purpose the determination of the relation between the bacterial infections of the uterus and the flora of the alimentary tube of the fetus and the persistence of the abortion bacillus in the uterus subsequent to abortion and parturition. This work was done largely by Dr. Bandeen with the advice and assistance of Drs. Hallman and Stafseth.

METHOD OF INVESTIGATION

Immediately after abortion or apparently normal parturition (cases in which the calf lived) the buttocks and tail of the calf were thoroughly washed with mercurial soap and water. A sterile rubber glove was then put on the hand, and by means of the first finger inserted into the rectum a small amount of meconium was obtained for bacteriological examination. If the fetus was dead at the time of abortion, or died in a few minutes afterwards, it was taken to the laboratory where the meconium could be obtained under strictly aseptic conditions. At the laboratory the fetus was opened to expose the stomach and intestines, then a red-hot spatula was held on an area of the stomach as well as on a part of the colon to be opened. A sharp scalpel that had been previously boiled in water was used to open the stomach. A different scalpel was used for the opening of the colon. The material was taken from the stomach by a sterile 10 c.c. pipette which was forced through the small opening made by the scalpel. The meconium was taken from the colon by a small spatula. Material from each was placed in a sterile Esmarch dish.

Material was collected from the uterus of the cow within a few hours after abortion or apparently normal parturition, also on the following day, and then once each week for several weeks. The buttocks, tail and vulva of the cow were thoroughly washed with mercurial soap and water. The vagina was washed out with plenty of physiological salt solution. The uterus was retracted with uterine retractors, and if in any case the cervical canal was closed or too

small for the metal catheter it was first dilated with a pair of uterine dilators. The introduction of a pair of dilators into the cervical canal should be done with great caution, as the congested mucosa is easily perforated. After dilation of the cervical canal a metal catheter was introduced into the uterine cavity. The catheter cannot be introduced to any considerable distance unless the end is turned to one side or the other, as the body of the uterus is comparatively short. If the catheter is inserted straight in, it will come in contact with the anterior wall separating the right and left horn.

The catheter was then connected with a force pump by means of a rubber tube and the sterile physiological salt solution pumped into the uterus. A return flow catheter was not used in this work. It was necessary to compress the rubber tube and hold the solution in the uterine cavity until the uterus was well massaged per rectum. When the uterus was well massaged the rubber tube was removed from the catheter and a small amount of the solution allowed to escape. A sterile flask was used to catch the remainder, which was taken to the laboratory.

In bad cases of pyometra, with abundance of pus, it was not necessary to use the physiological salt solution except for flushing the uterus as a therapeutic measure. Simply massaging the uterus per rectum sufficed to force out through the catheter a large quantity of pus, which was collected in a flask for the examination.

The results of the investigation are well shown in the tables, which are arranged to compare in parallel columns the micro-organisms found in the uterus of the dam with those found in the meconium and elsewhere in the fetus. It will be noted that in the case of the uterine examinations cultures were made successively over a considerable period of time or until it was difficult to explore the uterus, while in the case of the fetus only one examination was made.

In every case where guinea pigs were inoculated with uterine washings and with material from the fetus, negative results were secured from both macroscopic and microscopic autopsy examinations and from serological tests so far as *Bacterium abortus* is concerned.

RECORD OF EXPERIMENTS

Case 995 was purchased in 1913 at age of 1 year; blood test negative, August, 1913. November, 1913, received 10 c.c. culture of dead *Bacterium abortus*, also similar injections in December, 1913, January and February, 1914. May, 1914, serum reaction positive. In November, 1916, and December, 1916, she was given

5 c.c. and 10 c.c. respectively of dead culture of *Bacterium abortus*. February, 1917, she was given 20 c.c. of live culture of *Bacterium abortus*. All injections were subcutaneous. Serum reactions have been positive since February, 1917. Calved January, 1916. Bred again October, 1917, and aborted on the 249th day of gestation, June 24, 1918, following which a uterine infection developed. Cultures were made at this time. She was bred in July, 1918, and killed in January, 1919, for beef. She was pregnant in the left uterine horn. No organisms could be grown from the utero-chorionic space, amniotic fluid and meconium.

Case 995-B, the calf of 995, born alive but very weak.

Case 801 was purchased September, 1917; blood reaction negative. Bred November, 1917, and at week intervals beginning May, 1918, she received intravenously four injections of 5, 10, 20 and 20 c.c. respectively of live culture of *Bacterium abortus*. One week after the first injection she developed strong serum reactions to *Bacterium abortus*. She aborted July 17, 1918, the 257th day of gestation. Placentæ removed the following day, and the uterus flushed with an antiseptic solution.

Case 801-A, aborted fetus of 801, lived only about one hour.

Case 802 was purchased September, 1917; blood reactions negative throughout. Bred September 21, 1917, and calved June 27, 1918. She developed a uterine infection after parturition, the discharge being bloody.

Case 802-A was the strong, healthy calf of 802.

Case B. S., a Brown Swiss cow in a near-by herd, aborted July 5, 1918, on the 200th day of gestation.

Case B. S. A. was the aborted fetus of B. S.

Case 805 was purchased September, 1917; blood reaction negative. Bred November 3, 1917. At week intervals beginning May 29, 1918, she received subcutaneously 10, 20, 40 and 40 c.c. respectively of live culture of *Bacterium abortus*. By June 21 she developed a marked reaction to the serum tests persisting to date. She calved August 7, 1918, cleaned well, but developed a bad case of endometritis. *Bacterium abortus* persisted in the uterus for 28 days after parturition. She aborted an 8-month calf in May, 1919. *Bacterium abortus* found in exudate and milk.

Case 805-A was the strong and apparently healthy calf of 805.

Case 997-B was born February, 1916; blood negative to serum tests throughout. January 16, 1917, she received 25 c.c. of live culture of *Bacterium abortus*; also October 12 and again October 13, 1918, she received 5 c.c. of live culture on her feed. She calved November 15, 1918.

Case 997-B1 was the strong, healthy calf of 997-B.

Case 999 was purchased at the age of 1 year; blood reactions negative. October 10 and again November 8, 1913, she received 10 c.c. of live culture of *Bacterium abortus* subcutaneously, developing serum reactions October 29. She calved February 3, 1916. December 13, 1916, she received 10 c.c. of live culture *Bacterium abortus* intravenously, and reacted positively January 5, 1917. She calved November 5, 1917; was bred February 15, 1918, and calved November 26, 1918, cleaning normally.

Case 999-D was the strong healthy calf of 999, born November 26, 1918.

Case 806 was purchased September 7, 1917; negative to serum reactions. September 25, 1917, she received intravenously 10 c.c. of a killed culture of *Bacterium abortus* and October 5, 1917, she received 30 c.c. of live culture of *Bacterium abortus* and developed a full, positive reaction to the serum tests. This cow had failed to come in heat and had been given an electric dissociation treatment by Dr. Hallman. She was given live cultures of *Bacterium abortus* on her feed every day for one week beginning February 22, 1918. She was bred February 27 and calved November 25, 1918. Two days later there was a discharge of pus from the uterus.

Case 806-A was the calf of 806.

Case 11-A1-A was purchased January, 1917, at the age of 2 years, at which time the blood reaction was negative. She aborted her first calf January, 1917, and a year later gave birth to an apparently healthy calf. January 13, 1919, she calved normally again, cleaning within a few hours. Two weeks later there appeared a dirty yellowish discharge from the uterus.

Case 11-A1-A2 was the apparently normal calf of 11-A1-A, born January 13, 1919..

Case 999-A, born February 3, 1916, gave negative serum reactions throughout. She calved January 23, 1918, and again December 24, 1918. She cleaned in about 2 hours but developed a metritis.

Case 999-B was the apparently normal calf of 999-A, born December 24, 1918.

Case 807, purchased September 7, 1917, gave negative blood reactions. September 13, 1917, she was given 10 c.c. of a culture of killed *Bacterium abortus* subcutaneously. She developed a positive reaction September 20, 1917, lasting till November 16, 1917, since which time her reactions have been negative to the serum tests. September 23, 1917, she was given 25 c.c. of a culture of live *Bacterium abortus* subcutaneously. Since she did not come in heat she was given an electric dissociation treatment by Dr. Hallman January

2, 1918. April 2, 1918, she received 5 c.c. of a culture of live *Bacterium abortus* intravaginally and was immediately bred but failed to conceive. She was given the same treatment April 22, May 31 and June 9, 1918, and on June 10 she conceived. Beginning November 20, 1918, she discharged shreds of tissue and a dirty, yellowish, putrid pus. This continued until December 27, 1918, when she aborted. The placenta came away in small pieces mixed with pus as described.

A streptococcus isolated from this case six different times failed to grow the first 2 days of incubation. On the third day of growth in the Novy jar the colonies appeared as small, bluish pin-points. One cubic centimeter of a suspension of this culture injected subcutaneously into a pregnant guinea pig produced abortion in 3 days. One day later the guinea pig was autopsied. The spleen was once and a half its normal size. The streptococcus was isolated from the spleen, blood and uterus.

Case 807-A, the fetus of 807, was aborted on the 200th day of gestation. A streptococcus similar to that isolated from 807 was found in the blood, liver, spleen, stomach and meconium of the fetus. The liver and spleen of the fetus were very friable.

Case 997 was purchased at the age of 1 year. October 10 and again November 8, 1913, she received 10 c.c. of a live culture of *Bacterium abortus*. She developed a positive reaction to the abortion tests which was maintained until May 29, 1914. She calved February 4, 1916. December 18, 1916, she received 10 c.c. of a live culture of *Bacterium abortus*, after which she developed a positive reaction to the serum tests and maintained it. She calved December 21, 1916, and again January 18, 1919.

Case 997-C was the apparently strong and healthy calf of 997, born January 18, 1919.

TABLES.

A Comparison of Organisms from the Meconium and the Uterus.

Date	Case 995, Uterus	Case 995-B, Meconium
6-24-18	Bacillus subtilis B. coli communior Staph. pyogenes aureus	B. coli communior Staph. pyogenes aureus
6-28-18	Staph. pyogenes aureus B. coli communior	
7-3-18	Staph. pyogenes aureus Staph. pyogenes bovis Streptococcus pyogenes	
7-8-18	Staph. pyogenes bovis Streptococcus pyogenes	
7-12-18	B. 121.2421032	
7-17-18	No growth	

Date	Case 802, Uterus	Case 802-A, Meconium
6-27-18	Staph. pyogenes aureus	Staph. pyogenes bovis B. coli communior
7-3-18	Streptococcus pyogenes	
7-11-18	Staph. pyogenes bovis	
7-18-18	B. coli communior	
	Staph. pyogenes bovis	
	B. coli communior	
	Cervix was perforated	
Date	Case B. S., Uterus	Case B. S. A., Meconium
7-5-18	B. coli communior	Staph. pyogenes aureus B. coli (Sub-group II) B. coli communior Bact. 212.2441014 Heart blood, B. coli communior Stomach, no growth
	B. coli (Sub-group I)	
	Bact. 212.2442014	
	Bact. 111.2421014	
	Bact. 122.1111032	
	Bact. 222.2121012	
Date	Case 801, Uterus	Case 801-A Meconium
7-17-18	Bact. abortus	Staph. pyogenes bovis stomach, no growth
	Streptococcus pyogenes	
	Staph. pyogenes bovis	
	B. coli communior	
7-20-18	Bact. abortus	
	Streptococcus pyogenes	
	Staph. pyogenes bovis	
	B. coli communior	
7-26-18	Staph. pyogenes bovis	
	Streptococcus pyogenes	
8-1-18	B. subtilis	
	Staph. pyogenes bovis	
	Bact. abortus	
8-14-18	Staph. pyogenes bovis	
	Streptococcus pyogenes	
	Bact. 1224222034	
8-21-18	Streptococcus pyogenes	
8-28-18	No growth	
Date	Case 805, Uterus	Case 805-A Meconium
	Bact. abortus	Staph. pyogenes aureus B. coli communior
8-9-18	Bact. abortus	
8-15-18	B. pyogenes	
	Bact. abortus	
8-23-18	Staph. pyogenes albus	
	Streptococcus (Gram.)	
	Bact. abortus	
8-30-18	Streptococcus pyogenes	
	Staph. pyogenes bovis	
	Bact. abortus	
9-4-18	Streptococcus pyogenes	
	Bact. abortus	
9-11-18	Streptococcus pyogenes	
9-18-18	No growth	

Date	Case 997-B, Uterus	Case 997-B1, Meconium
11-15-18	Amniotic fluid, no growth	No growth
11-27-18	No growth	
11-5-18	No growth	
12-12-18	No growth	
Date	Case 606, Uterus	Case 806-A, Meconium
11-25-18	<i>B. coli</i> communior	<i>B. coli</i> communior
11-27-18	<i>B. coli</i> communior	
	<i>Streptococcus pyogenes</i>	
12-5-18	<i>B. coli</i> communior	
	<i>Streptococcus pyogenes</i>	
12-10-18	<i>B. coli</i> communior	
	<i>Streptococcus pyogenes</i>	
12-17-18	<i>Streptococcus pyogenes</i>	
12-22-18	Cervix closed	
Date	Case 999, Uterus	Case 999-D, Meconium
11-26-18	<i>Staph. pyogenes aureus</i>	<i>Staph. pyogenes aureus</i>
11-30-18	<i>Staph. pyogenes aureus</i>	
12-6-18	No growth	
Date	Case 999-A, Uterus	Case 999-B, Meconium
12-24-18	<i>B. coli</i> communior	<i>B. coli</i> communior
12-31-18	<i>B. coli</i> communior	
1-7-19	<i>Streptococcus</i>	
1-14-19	No growth	
1-21-19	<i>Streptococcus</i>	
1-28-19	No growth	
Date	Case 807, Uterus	Case 807-A, Meconium
12-27-18	<i>Streptococcus</i> <i>B. coli</i> communior	<i>Streptococcus</i> (<i>Streptococcus</i> in liver, spleen, blood and stomach)
12-28-18	<i>Streptococcus</i>	
	<i>B. coli</i> communior	
12-31-18	<i>Streptococcus</i>	
	<i>B. coli</i> communior	
1-7-19	<i>Streptococcus</i>	
1-14-19	<i>Streptococcus</i>	
1-21-19	<i>Streptococcus</i>	
1-29-19	No growth	
2-5-19	No growth	

Date	Case 11-A1-A, Uterus	Case 11-A1-A2, Meconium
1-13-19	No growth	No growth
1-14-19	No growth	
1-21-19	No growth	
1-29-19	<i>Streptococcus pyogenes</i>	
2-5-19	<i>Streptococcus pyogenes</i>	
2-12-19	No growth	
Date	Case 997, Uterus	Case 997-C, Meconium
1-18-19	No growth	No growth
1-21-19	No growth	
1-28-19	No growth	

SUMMARY AND CONCLUSIONS

In this series of 12 pairs of cases of fetus and dam, bacteria were isolated from the uterus in 11 cases and from the meconium in 9 cases.

Since the flora of the digestive tube of the fetus or living calf necessarily changes very soon after the end of intrauterine life, nothing was to be gained by making more than the initial examination of the meconium. As a result of the initial examination of the meconium and the uterus there were 3 of the 12 pairs of cases (uterus and meconium) that gave negative results (997-B, 11-A1-A, 997).

Bacillus coli communior and *Staphylococcus pyogenes aureus* were found in only one pair of cases (995).

Bacillus coli communior was found in three other pairs of cases (B.S., 806, 999-A), making its total appearances in 5 of the 12 pairs of cases or in 6 out of 9 cases of the meconium and 5 out of 11 cases of the uterus that showed any organisms at all.

Staphylococcus pyogenes aureus was found in a total of 3 uteri and in 4 meconia.

Staphylococcus pyogenes bovis was found in 2 pairs of cases (802-A and 801) and in a total of 4 uteri and in 2 meconia.

The only other organism significant by its appearance in both uterus and meconium was a streptococcus (807) of high virulence, except that in the pair of cases B. S. and B. S. A. there may have been an identity of a colon organism and a bacterium.

We are therefore inclined to believe that *Bacillus coli communior*, *Staphylococcus pyogenes aureus* and *Staphylococcus pyogenes bovis*

are very likely to occur in the uterus as well as in the digestive tube of the calf in cases of metritis.

Dr. Stafseth has found similar organisms in the deeper layers of the mucosæ in cases of metritis and has not found *Bacterium abortus* in the deeper layers. The significance of his findings will be discussed in detail in papers by himself and by Dr. Hallman.

Bacterium abortus was found only once in the uterus and in no case in meconium.

The significance of the presence or absence of *Bacterium abortus* in such cases as are included in this paper with special reference to the history of the cow as regards treatment with live cultures and previous abortions and serum reactions will be considered at another time. Attention is directed, however, to a study of the case reports recorded herein for suggestions in this connection.

OKLAHOMA NOTES

Drs. W. P. Shuler and H. W. Ayres, Deputy State Veterinarians, resigned February 5. Dr. Ayres and Dr. C. H. Hooker have opened an office in Oklahoma City and Dr. Shuler has accepted a lucrative position with an oil company in Texas.

Drs. C. O. Booth, of Oklahoma City, and S. P. Regan, of Wells-ville, N. Y., have been appointed to fill the vacancies on the State force.

Dr. Daniel M. Purdy, of Salina, Kan., has recently been appointed as a veterinary inspector on the meat inspection force at Oklahoma City.

Dr. Robert McCauley, of Chicago, has again entered the service of the Eagle Company at Oklahoma City.

A prominent swine breeder from the western part of the State recently secured a verdict of \$3,000 against a local serum company. It was claimed that the serum treatment caused a sickness in the plaintiff's stock and a suit for damages resulted. Our understanding is that the court instructed the jury to find for the defendant if it was proven that the serum was produced under Federal supervision and properly administered. However, the jury appears to have disregarded instructions and found for the plaintiff. The district judge on reviewing the case on the 12th instant set the verdict aside. This will probably have a tendency to curb the increasing amount of litigation against serum companies.

J. S. GROVE.

SWINE OBSTETRICS¹

By E. R. TILLISCH, *Westbrook, Minn.*

SWINE obstetrics, in its most restricted sense, is a consideration of the necessary or advisable oversight or aid during the act of parturition. The subject is one of intense scientific and economic importance as it lies at the very foundation which largely determines the ultimate success or failure of this great swine industry.

To take charge of swine obstetrics successfully we must know the anatomy of all those organs having a vital relation to the act of reproduction either directly or indirectly, a study of the physiologic functions of the reproductive organs, also the pathology of breeding and the pathology of pregnancy. And in order to succeed the veterinarian must be judiciously equipped, not only from the standpoint of quantity and quality, but also in reference to the readiness of his equipment for immediate use. The equipment should be carefully selected and arranged and should include every article which is likely to be needed during the operation, and should be carefully packed in a container ready for immediate transportation, so that no article of importance will be left behind or forgotten.

The instruments I use are ample in number, simple in character, but efficient for any operation or manipulation which I may be called upon to perform.

The contents of my obstetric outfit for swine are as follows: A bottle of pituitary extract, two or three ordinary pig forceps, a hook, some soft copper wire, a razor, two scalpels, three or four dressing forceps, one needle forceps, needles for suturing, suture consisting of cat gut, twisted silk, and some heavy twisted linen, several packages of sterile gauze, each piece being about one yard in size, a package of absorbent cotton, some drug for disinfection, antiseptic liquid soap, and a four-ounce bottle of tincture of iodine, several doses of quinine and urea hydrochloride, also some camphorated oil for a stimulant. Now for a call to a sow which is farrowing. First get the history as to the length of time sow in question has been sick. Has any one worked with her? Did she have any pigs? Were they born dead or alive? Ask your client for a basin of warm soft water, wash your hands in a clean disinfectant solution, lubricate them with vaseline, and examine the vagina to see whether it has been torn by any one that might have

¹ Presented at the Twenty-third Annual Meeting of the Minnesota State Veterinary Medical Association, St. Paul, Minn., January, 1920.

tried his ability. Should you find any parts torn, explain to the client that this may be the cause of death by infection already introduced in such a wound. And all practitioners will admit that a lot of sows will be sick for from one to three or four days before the veterinary surgeon is called in. Where the patient is found with a large swelling of the vulva and vagina, a high temperature, and the sides of the sow are extending and animal shows great pain on being handled, it would be well to explain conditions to the owner and have the animal destroyed. But provided you find that the sow has not been sick very long and the genital passage is in good condition, you may then feel for the fetus, and if it is up so it can be felt it is an easy matter to place a forceps against the head of the fetus and when labor lets up the fetus will naturally slide back a little. Follow it and at the same time open the jaws of the forceps so the head of the fetus will pass into same when the next labor pain takes place. Now that you have a firm hold, traction should be applied slowly and delivery will be brought about by the aid of the laboring of the sow. This one being delivered, leave the patient to rest for ten or fifteen minutes. By this time you will be able to feel another fetus provided labor is not exhausted, and in such a case pituitary extract should be given in a small dose which will stimulate labor. If the fetus is normal and alive it can be felt in the course of a few minutes, and the forceps can be used as above described. Should the fetus fail to move upward give a larger dose of pituitary extract, then wait fifteen to twenty-five minutes for results. If on examination there is no fetus to be felt it would be well to explain to the client that the Caesarian section would be the only and best way to save the life of the sow. Explain that while the sow may die after the operation, 70 per cent will recover.

The Caesarian section was resorted to in early days to save the fetus, but today the operation is performed to save both the fetus and the mother. Caesarian section is resorted to in the sow because embryotomy is impossible owing to the smallness of the pelvic canal. There are several reasons why a veterinarian should resort to the operation at an early stage. While you wait the sow loses all her vitality and the client gets disgusted. This is usually during the busiest season for the veterinarian and one cannot afford to spend all day or night with one sow; therefore, one had better perform the operation which will be outlined below.

The sow is placed on her left side which gives free access to the

right flank which is my favorite seat for operation. The sow does not need to be tied, but ask the client to place his knee against the sow's neck and hold the upper fore leg with one hand so she will not get up. The necessary equipment is included in the previously mentioned container. Wash the flank with liquid soap, shave the hair, then inject into several places in the flank with a hypodermic syringe two to four grains of quinine and urea hydrochloride, which comprises the necessary anesthesia for the operation. Then clean the flank again, paint it over with tincture of iodine, take a piece of the sterile gauze, cut an oblique hole about eight inches long in the center of it and place it over the sow with the opening directly over the seat for the incision. Then I ask the client to tighten his hold on the leg and I make a deep cut through the skin and fat tissue with a sharp scalpel. This cut which is about seven to eight inches long, begins at the external angle of the ileum, between it and the last rib. Then I separate the oblique muscles with the handle of my scalpel, following the grain of the tissue. This brings me to the peritoneal lining which I incise with the scalpel. Placing a finger on the membrane and with the scalpel placed alongside of the finger, a very slight thrust will force it through; the incision can be enlarged by means of a probe-pointed bistoury or it may be torn. It is more tedious to divide the muscles along the grain and somewhat inconvenient, but I prefer that to a clean cut as the muscle tissue will prevent the viscera from floating out. The incision through the peritoneal lining being made, I disinfect my hand well and then reach in and grasp the uterus about five or six inches from the bifurcation. This part is brought out through the opening, usually by grasping one of the pigs inside of the uterus. I then make an incision about 5 or 6 inches long cutting against the fetus which is in the loop of the uterus. I then pull out this fetus and remove all the remaining through the same incision by working my hand into the uterus. All fetuses and placental membrane being removed, clean the wound in the uterus, wipe the edges with a piece of gauze dipped in tincture of iodine and suture with cat gut; a running suture will do. The uterus being replaced, suture the peritoneal lining with cat gut the same as the uterus. The muscles will close automatically. Wipe the wound with a gauze dipped in tincture of iodine, then sew the skin with strong Irish linen dipped in tincture of iodine. This completed, instruct the owner to apply a little tincture of iodine solution to the wound once or twice daily. Keep the patient in a clean dry place and feed with a light laxative diet.

THE VETERINARY CORPS OF THE AMERICAN EXPEDITIONARY FORCES¹

By LIEUTENANT-COLONEL H. E. BEMIS

Ames, Iowa

IN the preparation of this paper no attempt has been made to write a complete history of the Veterinary Corps of the A. E. F., nor to recite the hardships or accomplishments of the individual. The first would be impossible in the length of time allotted, and the second is of no consequence when considering the Corps as a whole. An attempt has been made rather to write a running account of the development of the Corps, giving the conditions under which it operated in its various stages and the results accomplished in each, with the hope of drawing conclusions which may be of some use in the future, and to offer some encouragement to the members of the profession as a whole.

I have written the story in two parts, corresponding to the two distinct types of administration. The first extends from the beginning of the A. E. F. to September 1, 1918, and the second extends from the latter date to the end of operations nearly a year later. The two periods are about equal in length.

FIRST PERIOD

Organization of Personnel

The early part of this period was the formative period for all departments of the A. E. F. There was little to guide the General Staff in the formation of the Veterinary Corps except the Act of Congress of June 6, 1916, which placed the Corps under the direction of the Surgeon General.

Evidently the General Staff quite soon gave some thought to the need of a veterinary service, but it apparently had little conception of what was being done in the Allied armies or of what would eventually be necessary for the successful operation of the Corps. In fact it seemed to have little conception of a veterinary service operating as a corps. This became apparent through the appearance of General Orders No. 39 and 42, issued the latter part of September, 1917.

G. O. No. 39 provided for the organization of mobile and sta-

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

tionary veterinary hospitals which were to be attached to the Remount Service. It authorized the organization of one remount depot and one mobile veterinary hospital for each corps and one for each army, and also authorized the organization of advanced veterinary hospitals attached to advanced remount depots, one per army, capacity of 1,000 animals, in the advanced section of the L. of C.; intermediate veterinary hospitals attached to intermediate remount depots in the intermediate section, and base hospitals attached to base remount depots in the base section.

G. O. No. 42 authorized one private, first class, or private, Medical Department, as assistant with each veterinary surgeon, and one sergeant, Medical Department, for duty with the principal veterinary surgeon of each regiment of cavalry and field artillery, in addition to the private. This order also specified that when animals were treated in the regiment, details would be made by the proper commanding officer from troops, batteries or quartermaster corps to care for those animals and to attend to the general policing of the stables.

These two General Orders provided a curious combination in which medical personnel operated under the control of the Quartermaster Department. No definite organization was possible other than to provide some veterinary personnel wherever sick animals happened to be found, after the plan used by the Regular Army in peace times. While there was provision for hospitals, there was no provision for evacuating units and no way of coördinating the work of the various organizations of the corps.

During August, 1917, thirty or forty young reserve officers, Veterinary Corps, arrived in France. Most of these had had no military experience of any kind, some of them barely having had time to purchase their uniforms in New York before embarking. They were sent chiefly to French hospitals for a period of training. As the number of American animals at this time was very small and sickness had not developed to any extent, there was little actual work to be done, and the A. E. F. had not yet learned the meaning of prevention.

The first animals were acquired by the American forces about July 4, 1917, from the British, French and Spanish. The number had reached approximately 15,000 by November 1, 1917.

On October 20, 1917, Major Louis A. Klein and Major A. L. Mason, Veterinary Corps, were ordered to France to report to the

Commanding General, A. E. F., per G. O. No. 108, for temporary duty and consultation in connection with organizing, equipping and supplying the Veterinary Department of the Expeditionary Forces. Upon arrival in France they received instructions from General Headquarters to report to the commanding officer of Medical Supply Depot No. 2, who in turn referred them to Major R. H. Power, Veterinary Corps, in charge of the veterinary section of the depot. Having completed their observations at the supply depot, they requested authority to proceed to Headquarters, L. of C., to consult with the Chief Surgeon, L. of C., but before receiving such authority they were summoned to Headquarters, L. of C., for temporary duty to consult with the remount officer.

The Chief Remount Officer had just been on a tour of observation of the British Army. What he had seen of their veterinary service had convinced him that the veterinary organization provided for in G. O. Nos. 39 and 42 was not sufficient for the A. E. F. When the plan of organization recommended by the Surgeon General was outlined to him by Major Klein he expressed the opinion that with the corps and army mobile veterinary hospitals added it would meet the conditions of the A. E. F. admirably, and suggested that the proposed tables of organization be revised to include these two organizations. On December 14, 1917, an order was received directing Majors Klein and Mason to proceed to Headquarters and report to the Chief Surgeon, A. E. F. They were at once received by the Chief Surgeon, who was very anxious that the veterinary service of the A. E. F. be properly organized, and arranged for a conference the next morning.

At this conference the plans for the organization of the veterinary service which had been prepared in the office of the Surgeon General were presented to him, together with a copy of the regulations which were intended to govern the operation of the Veterinary Corps. At the request of the Chief Surgeon a memorandum was prepared and presented on December 27. It described briefly the service which could be rendered to the A. E. F. by the Veterinary Corps, specified the personnel authorized by G. O. No. 120, paragraph 3, W. D., October 4, 1917, outlined the organization recommended by the Surgeon General as directed by section 5, pointed out the necessity of centralizing the administrative functions, and indicated how the proposed organization would supplement the organization provided for by G. O. No. 39, A. E. F., etc. About this time a cablegram was received from the United States stating that the plan of organi-

zation of Veterinary Corps presented by the Surgeon General and Special Regulations No. 70 had been adopted.

While this memorandum was being prepared a memorandum was received in the Chief Surgeon's office, which was signed by A. C. of S. G-1, stating that the Commander-in-Chief had decided to suspend the application of so much of the Veterinary Corps regulations as was in conflict with the organization of the Remount Service, A. E. F., as outlined in G. O. No. 39, and that while the personnel of the Veterinary Corps would remain under the general supervision of the Medical Department, the Commander-in-Chief directed that the assignment of all veterinary personnel be made in accordance with recommendations submitted by the Remount Service. When this order was issued the Chief of the Remount Service assumed the direction of all the veterinary personnel on duty in the A. E. F.

On January 2, Majors Klein and Mason had an interview with A. C. of S. G-1. After an explanation of the organization the A. C. of S. G-1 stated he was opposed to organizing a separate veterinary service, as it would complicate the administrative work to have too many independent services, and the Veterinary Service would therefore have to be attached to the Remount Service. On January 18 the Chief Surgeon requested Majors Klein and Mason to prepare a memorandum stating the reasons why the Veterinary Service should not be attached to the Remount Service, and describing how it should be organized. This memorandum was completed and presented to the Chief Surgeon on January 20, together with a proposed order to authorize the organization of the Veterinary Service. This plan of organization was presented by the Chief Surgeon to a new Chief of the Remount Service, who expressed himself in favor of a separate Veterinary Service; the organization proposed met with his approval. The Chief Surgeon then incorporated the memorandum and the proposed order in a letter which was sent to the Chief of Staff on January 20, together with a letter from the Surgeon General to the Chief Surgeon, dealing with the organization of the Veterinary Service. Again the proposed organization was turned down.

Following this action further efforts were made to organize the service under the Remount Service and to prepare it in accordance with the ideas of A. C. of S. G-1. The new order attached the Veterinary Service to the Remount Service and provided that an officer of the Veterinary Corps should be designated as Chief Veteri-

narian and assigned to act as assistant to the Chief of the Remount Service, to exercise technical supervision over the Veterinary Service, to draw up regulations and orders and a detailed professional description of all preventive and curative treatments of animal diseases and injuries. The latter were to be printed and distributed to the commanding officers of all organizations containing animals and must then be followed by everyone.

The provisions of this order demonstrated again the failure on the part of staff officers to appreciate that the Veterinary Service could and should operate as independently as possible of the line organization if any uniformity and efficiency were to be obtained in the handling of animal diseases. On February 27, 1918, the Chief Surgeon was notified that a definite decision had been reached and that he should report veterinary personnel to Headquarters, Service of Supply, for assignment by the Remount Service. Major W. P. Hill, V. C., was appointed as Chief Veterinarian under this order.

Thus the General Staff saw fit to organize a veterinary service for the A. E. F. which was not in accord with the plan which had been adopted in the United States and which had been approved and urged by the Chief Surgeon, A. E. F., two successive chiefs of the Remount Service, and the two special representatives sent to France by the Surgeon General.

Condition of Animal Health

During this period of struggle for existence on the inside, the situation concerning animal health and efficiency was constantly growing worse in the field. By the first of March, 1918, there were six divisions in France and others were arriving almost daily. These divisions were provided with veterinary personnel intact, as organized on this side of the water; they were familiar with Special Regulations No. 70 and with the reports required by the Surgeon General. Upon arrival in France all this was discontinued and each one did his work more or less in his own way.

The first veterinary hospital was organized at Neufchateau during January and February, 1918. The first two regularly organized veterinary hospitals arrived in France April 10, 1918, and during the following three months Advance Hospitals Nos. 1 to 10, inclusive, Base Hospital No. 1, Army Mobile Hospital No. 1 and Corps Mobile Hospital No. 1 arrived and were stationed through orders issued by the Chief Veterinarian through the Chief Remount Officer.

About this time all shipments of animals from the United States

were discontinued in order to make room for men and supplies. To keep up the supply of animals, which now numbered only about 55,000, 50,000 were purchased from the French. These animals were for the most part young animals from 3 to 7 years old. They were taken from the French farms where they were accustomed to very careful handling and sent immediately to remount depots and artillery training camps where they were needed for immediate use. Needless to say, animals of this age became sick in large numbers, and the hospitals therefore were largely stationed at remount depots and training camps and assigned to duty under the commanding officers of such camps. In some instances hospitals were split into two or more sections and distributed to the centers of sickness. This condition continued through June, July and August, 1918.

Up to this time the American divisions had been attached to the British and French armies, and consequently the lack of organization of the Veterinary Corps and the scarcity in the supply of remounts had not been so keenly felt. During July and August, however, there was a great demand for horses in order that our own divisions might be fully equipped to take their place in the American First Army operating entirely independent of any other forces. Because of the lack of remounts these newly purchased and convalescent horses were put into training and rapidly taken to the front, where they were retained as long as they were of any possible service.

Another factor which greatly increased the inefficiency of our animals was the almost universal lack of horsemanship on the part of the line officers and enlisted men. Little or no attention had been given to the care of animals in our training camps, and many of our regiments whose personnel had been drawn with the understanding that they would be supplied with motors were at the last moment equipped with horses. As a result, horses were sometimes loaded on trains for a three or four days' trip with the harness on their backs. Animals were left harnessed while standing on picket lines awaiting orders; they were seldom groomed, and sometimes not fed or watered for two or three days or were fed hay and grain spread upon the surface of the mud in which they were standing. Some of these conditions were not always avoidable, but many times they could have been improved by the use of a little common sense and ingenuity in horse management.

By the last of August, 1918, these three factors, namely, lack of proper supply of remounts, lack of independent organization of the

Veterinary Corps, and bad horsemanship in general, were rapidly limiting the mobility of the Army.

About August 1, 1918, the First American Army started operating independently. The American area in France was divided into the Zone of the Army, which extended back a few kilometers from the front, and the Service of Supply, which bordered on the Zone of the Army and extended all the way back to the base ports which were used by the A. E. F. The S. O. S. was divided into the Advance, Intermediate and Base sections, and so far as the Veterinary Service is concerned it contained all the veterinary hospitals, remount stations and training camps, which, as previously explained, had become centers of sickness.

The duty of the Veterinary Service of the Army should have been to treat minor ailments, to control disease in the field and to evacuate inefficient animals to the hospitals of the S. O. S. The duties of the Veterinary Service of the S. O. S. should have been to control disease among animals of the remounts and training camps and to treat the sick and injured from all sources. This required a directing hand and head with jurisdiction over the entire service and with sufficient personnel at his own command to meet the situation. There had been no plan made for evacuating the sick from the Army. Divisions were treating their own sick in the organizations and the mobile sections. Hospitals were filled with sick from the remount depots and training camps. No definite asking had been made for securing more hospitals from the United States, there was no provision on tables of organization for an army or corps or section veterinarian, to say nothing of provision for an office force or transportation. These were strictly A. E. F. necessities and required revision of S. R. No. 70 to provide them.

Conditions at End of First Period

Briefly, the veterinary organization at the end of the first period consisted of the following:

1. A Chief Veterinarian acting as a technical adviser to the Chief Remount Officer.
2. A Chief Veterinarian of the First Army who was not appointed by or responsible to the Chief Veterinarian, A. E. F. The two offices had little in common.
3. Ten advance hospitals and one base hospital, which were serving chiefly remount depots and training camps.
4. One Assistant Chief Veterinarian in the Advance Section, S.

O. S., who was supervising the work of the hospitals in that section.

5. One army mobile hospital and one corps mobile hospital operating in the First Army.

6. About 30 divisions with their organizations, many of them scattered, artillery separated from infantry. The Division Veterinarian usually remained with Division Headquarters and supervised the work of only those units which were within his reach. The other units had no supervision.

By the end of August, 1918, there were 170,000 animals in the A. E. F. Of these there were on sick report about 45,000, in hospitals 18,000. Named in order of their importance the diseases were as follows: Mange, exhaustion and overwork, influenza and its complications, injuries and gunshot wounds, glanders, lymphangitis.

SECOND PERIOD

Organization and Personnel

As a result of these conditions, and as a result of the very efficient work of the British liaison officer who had been lent to our service to help with the organization, the Commander-in-Chief decided upon a radical change in the organization of the Veterinary Service. Accordingly the plan which had been presented by Majors Klein and Mason nearly a year previously was adopted. A new Chief Veterinarian, A. E. F., was appointed, operating directly under the Chief Surgeon but being vested with the establishment, control and administration of the Veterinary Service. Headquarters were necessarily established at Headquarters, S. O. S. Veterinarians were appointed in each army and corps, and Assistant Chief Veterinarians in each section of the S. O. S., namely, Advance, Intermediate and Base. Each army veterinarian and each chief of section were made responsible for the coördination and administration of the work of his department. Veterinary hospitals were placed under the command of their own officers and removed from remount depots as fast as possible. Steps were taken to collect the scattered units into whole organizations. The evacuation of sick animals from all divisions was insisted upon, and mobile sections were required to perform the duties of evacuating sections instead of acting as hospitals. The prompt rendering of weekly reports was immediately instituted, copies of Special Regulations No. 70 and the Guide to Veterinarians were distributed, and charts and instructions concerning the internal organization of veterinary hospitals and the method

of evacuating from divisions were forwarded to all concerned. A weekly news bulletin was instituted and sent to all veterinarians. A weekly statistical report and review of the situation, or a war diary, was prepared and sent to the Chief Surgeon, the Surgeon General, and the Commanding General, S. O. S. New tables of organization were prepared, providing assistants for the new positions created, and providing increased personnel for evacuating units.

Up to this time practically no promotions had been made in the Veterinary Corps, A. E. F. Many of the veterinarians with the first divisions and most of the casual veterinarians who went to France early had the rank of second lieutenant and had served nearly a year on foreign soil, perhaps almost constantly under fire, without receiving promotion, leave of absence or change of station, while many of the officers arriving later had been promoted to higher grades before leaving the United States. This one condition alone led to a great deal of discontent and complaint among the veterinarians themselves. Recommendations for promotion had been made to the Chief Veterinarian, who was working under the Chief Remount Officer, while promotions were made through the recommendations of the Chief Surgeon, because the Medical Department was responsible for the veterinary personnel. With this situation existing it was very difficult to obtain promotion. After the change in administration, promotions were put upon the same basis as promotions in other branches of the Medical Department, and almost immediately about 50 were made, later another 50, and the third installment was ready to be forwarded when the armistice was signed and all promotions were discontinued for the time being.

The lack of personnel, both enlisted and commissioned, to evacuate and care for the number of sick animals, which was now rapidly increasing daily, was very apparent. The operations at the front were extensive, and aside from the injuries due to enemy fire the animals which were largely unfit when taken to the front rapidly decreased in efficiency. The First Army had but one army mobile hospital and one regularly organized corps mobile hospital with which to carry on these evacuations, and every veterinary hospital was attempting to care for nearly twice as many animals as it was intended to care for. The need for additional personnel was very urgent. Cables were immediately sent to the United States to rush hospitals and replacement units. In the meantime personnel was borrowed from the Remount Service and a great effort was made

to secure labor battalions. About 1,300 such troops were secured, half of them being assigned to the Chief Veterinarian of the First Army for evacuating purposes and the other half assigned to hospitals. Requests for as many more labor troops had been urged for some time, but the Chief Veterinarian was informed that no more were available.

To add further to the difficulties of evacuating animals promptly and with the least loss, the staff of the First Army for some time refused the use of the railroads for such purposes, insisting that evacuation should be made overland. While this question was being fought out, hundreds of animals were lost through being evacuated long distances overland when in a debilitated and sick condition, often lame, unshod, or suffering from serious wounds, while thousands were retained with divisions through the inability of the veterinary personnel to cope with the requirements of long overland evacuations. As a result of this combination of circumstances many animals died or were seen in a bad condition, often necessarily untreated, while in the hands of veterinary personnel. Inspectors often made reports upon such conditions, reporting what could be seen without considering the causes. Finally evacuation by rail was permitted and veterinary evacuating stations were established by the Chief Veterinarian and Army Veterinarian and were placed under the direct control of the Army Veterinarian. From this time progress was rapid. The First Army evacuated 11,507 animals to hospitals during the period September 7 to November 11, 1918, and during the St. Mihiel and Argonne offensives combined the veterinary evacuating stations handled 23,378 animals.

As a result of this organization and the policy of evacuating sick and injured animals to hospitals for treatment, the already overcrowded hospitals, 11 in number, were subjected to a still greater strain. Not only was it necessary to take care of twice as many animals as should have been allotted to the hospitals, but at the same time it was necessary for veterinary personnel to construct the buildings, roads and picket lines to accommodate these animals, as it was almost impossible to secure engineering units for such work at this time. In spite of this situation it should be recorded to the great credit of the assistant chiefs of sections and the hospital commanders and personnel that at no time were animals from the front refused admission to the hospitals.

By the end of October, 1918, help was in sight. Veterinary Hospitals Nos. 12 and 21 were arriving or were reported to be upon

the water, hospital locations had been planned ahead, and the Assistant Chief of Base Sections was prepared to meet organizations as they arrived at base ports so that they might receive instructions concerning their new duties and be forwarded to their locations with the utmost rapidity. Until these hospitals could be located an almost daily request was being placed with Headquarters, S. O. S., for additional labor companies to relieve the strain upon the hospitals. Some companies were secured, but not sufficient to supply the needs.

With help this near at hand, and with the Veterinary Corps in sight of its goal of a finished, efficient organization in the space of eight short weeks of reconstruction, the Commander-in-Chief issued telegraphic orders on November 3, just eight days before the signing of the armistice, which once again placed a line officer of cavalry, until recently employed in the office of the Remount Division of the Quartermaster Corps, as Chief Veterinarian. The telegram stated that there was no criticism of the handling of the professional side of the Veterinary Corps and that when the former chief became more familiar with the military organization there was no reason why he should not be reinstated.

The first work of the new chief was to secure immediately the additional personnel needed at hospitals which had been repeatedly requested by the former chief without results, and to place the veterinary hospitals which were then arriving daily. With the help of double the hospital personnel, and with the pressure relieved at the front through the signing of the armistice, great improvement began to be made in the condition of the hospitals. A Major of Engineers was added to the Chief Veterinarian's office for the purpose of securing additional construction as rapidly as possible. Four or five additional officers of cavalry were appointed as inspectors of veterinary organizations. Naturally their recommendations were chiefly along the line of improvement in the military organization of the hospitals, which under the circumstances could now receive much more attention, and which naturally led to considerable improvement in the work of the hospitals, judged from the military point of view. Beyond this no changes were made in the organization as it had been developed by its former chief. Let it be said to the credit of the new chief and to the veterinarians that each performed the work with which they were familiar and all continued to work for the best interests of the Veterinary Corps.

The First Army was withdrawn into the advanced section, the Second Army remained practically in position, while the Third

Army, provided with animals drawn from the First and Second Armies, was formed for the march into Germany. At this time the condition of the animals as a whole was very bad. The statistical reports of the Third Army, which was supposed to have the best of the animals, showed 20 per cent to be affected with mange, quite a number of cases of glanders existed, and debility and overwork were very common. During the march 1,600 animals were evacuated to hospitals.

As the armies became stationary the policy of evacuating to hospitals was largely reversed. Dipping stations were built in every divisional area and the cases were treated in their own organizations under the supervision of veterinary personnel. Veterinary supplies, which had been very meager and hard to obtain up to this time, began to arrive in quantities. The field unit chests and the officers' and farriers' chests were supplied for the first time. Lime and sulphur, which it had been almost impossible to obtain, were found in large quantities in the German territory. Clipping machines, which had never been provided in sufficient quantities, were secured. Animals were clipped and dipped during the entire winter, and as a result mange and emaciation were reduced to almost nothing by the fore part of May, 1919. By a similar very thorough campaign against glanders this disease was also practically eliminated. Lymphangitis was controlled largely by the destruction of all cases as soon as they made their appearance. Aside from these three diseases there were very few conditions requiring treatment, except the usual wounds due to kicks and treads, quittors, nail wounds, and paralysis of the penis, the latter probably due to influenza or general debility and overwork.

Hospitals and mobile sections settled down to real satisfactory work, as they had never been able to do before because of the overcrowded conditions and constant changing of animals. Receiving wards, medical wards and surgical wards were maintained in each, and much good work was accomplished.

The veterinary personnel of the A. E. F. on the whole compared very creditably with the personnel of other branches of the service and with the veterinary personnel of the Allied armies. The ability of our officers was on a number of occasions the subject of favorable comment from the office of the Director of the British Veterinary Service. The final results obtained were very gratifying and were the subject of many letters of congratulation and appreciation from commanding generals of divisions, corps and armies and from the

Commander-in-Chief himself. The Corps when once established always enjoyed the hearty support of the Commanding General, S. O. S., the Chief Remount Officer, and the Chief Surgeon and all his staff. The final picture of the Veterinary Corps, A. E. F., which should remain in our minds is that of an organization consisting of the following:

The Chief Veterinarian and his corps of assistants in the office of the Chief Surgeon.

Three section veterinarians with their assistants and office personnel.

Three army veterinarians and assistants.

Nine corps veterinarians and assistants.

Thirty-some divisions each with its veterinary organization.

Numerous remount depots and training camps with their organizations.

Nine corps mobile hospitals.

Six army evacuating hospitals.

Twenty-one large hospitals and two base hospitals scattered from Bordeaux to Coblenz, each commanded by veterinary officers and manned by Veterinary Corps personnel.

In all, 897 officers and 9,803 enlisted men thrown into one working organization in eight weeks during the heaviest fighting and after sickness and disorder had accumulated.

From September 1, 1918, to September 1, 1919, 317,690 animals were admitted on sick report; 167,873 animals were returned to duty; 948,065 animals were mallein tested and retested, of which 2,165 were destroyed upon first test and 556 upon retest; 105,019 animals were treated for mange, 21,163 for influenza; 2,079 for pneumonia, and there were 549 cases of lymphangitis and 885 cases of cellulitis.

The American service always enjoyed the hearty cooperation of the British and French services. Contact with the British service was maintained through Lieutenant-Colonel J. J. Aitken, the value of whose services in the organization work cannot be overestimated. Contact with the French service was maintained through the Franco-American Liaison Mission, which was headed by Colonel Brocq-Roussou. French liaison officers were appointed by him to the offices of the Chief Veterinarian, the Chief Veterinarian of each army and the Chief Veterinarian of the Advance Section. I believe the favorable acquaintances made by veterinarians with staff and line officers will be one of the greatest factors for good in the future development of the Veterinary Corps.

CONCLUSIONS

In conclusion, the experiences of the Veterinary Corps in France demonstrated the following:

1. That most American veterinarians are sufficiently well trained professionally to render an efficient service in the Army, but that they should have a period of special training to teach them to adapt their knowledge to army conditions.
2. That they are quick to adapt themselves to field service and are capable of commanding troops.
3. That the attitude of the Regular Army toward an Army Veterinary Service had not permitted or encouraged leadership among veterinarians of the Army, and as a consequence there were not sufficient veterinarians of both military and administrative experience to fill administrative positions early in the war.
4. That the organization which was finally adopted, and which placed a veterinarian at the head of the service under the direction of the Chief Surgeon, was an efficient organization, capable of being adapted to any circumstances by altering the units which composed it to suit conditions.
5. That the Veterinary Service should have a representative upon the General Staff for the purpose of guiding the Staff and guiding the service from the very initiation of every policy.

Dr. Wilbur H. Hurst severed his connection with the Bureau of Animal Industry February 29, 1920. Dr. Hurst entered the Bureau in January, 1903, and served in various phases of activities, having during the past two and a half years been assigned to hog cholera control work in Iowa.

Dr. C. C. Hooker, after having retired from practice for the past two years, has entered partnership with H. Wood Ayers, formerly Deputy State Veterinarian of Oklahoma. They are located at Oklahoma City, with a well-equipped modern hospital.

Dr. Bernado Crespo of the Cuban Agricultural Department was a recent guest in Lexington, Ky., visiting several famous studs. He is interested in Thoroughbred horses and purebred beef cattle, and spent most of his time on the stock farms in the Blue Grass State.

CLINICAL AND CASE REPORTS

BOTULISM IN CHICKENS

By GEORGE H. HART

Division of Veterinary Science, University of California

OUR attention was recently called to a severe loss sustained among a flock of 800 fowls in Santa Clara County, California, from feeding spoiled string beans, home-canned by the cold pack method. The beans were put up in large glass jars during the Summer of 1919. On January 26 or 27, 1920, four jars of these beans were sent to the kitchen to be prepared for the table. Upon removing the lids, the cook noticed a very bad odor to the beans in all four jars and therefore threw them into the garbage pail.

The contents of this garbage pail, consisting of the beans and other kitchen refuse, were fed to the chickens probably on January 27, 1920. The following evening the fowls began to show symptoms and on Thursday, January 29, 250 died. Thursday evening four affected hens were brought to the Division of Veterinary Science, University of California, and from the typical symptoms manifested a diagnosis of botulism or limberneck was made. (This application of the term limberneck should not confound this disease with wryneck of poultry.) The following day a visit was made to the ranch and 300 fowls were found affected with the disease in its various stages.

The chickens shown in figure 1, even though so far advanced in the disease as to be unable to hold their heads off the ground or to stand up, were still able to lay eggs and many eggs were found in the yard containing the affected birds.

An interesting observation was made by the attendant in finding a wild bird, which had had access to the feeding troughs, affected in a similar manner to the chickens. The bird was so badly affected that the attendant was able to pick it up, but later it managed to get under a building and was not seen at the time of our visit. From the description of the bird, it was probably a California linnet.

A healthy cockerel at the Veterinary Science Laboratory was fed the crop contents of one hen dead of the disease on January 29 and the crop contents of another on January 30. It developed a typical case of the disease, showing the first symptoms on January 31, and, after being at the point of death for several days, began to show

improvement and gradually recovered. This was of interest in showing the length of time the toxin remained in the crop despite the fact that the chickens had probably eaten other normal food before they showed evidence of the disease.

Figure 2 shows the typical symptoms of an affected bird. These identical symptoms have been produced in our laboratory with toxin from known strains of *Bacillus botulinus*.

In all, a total of 643 chickens, valued at \$1,500, died in 4 days. This is the largest single loss of this nature which has ever been reported, to our knowledge. Minor losses from a similar cause have not been uncommon in this State. From several of these out-

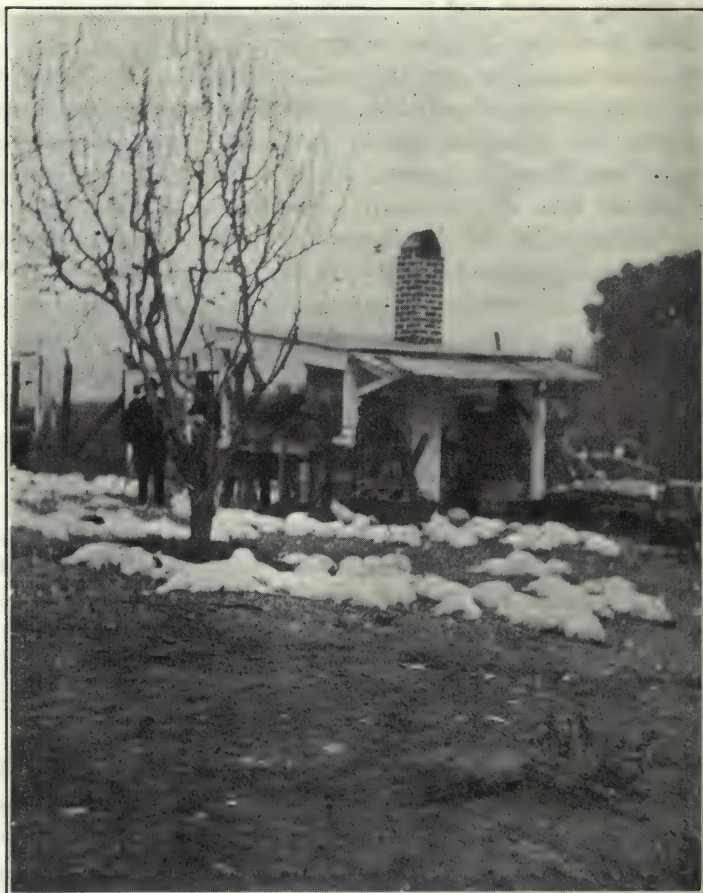


FIG. 1.—*Fowls in Advanced Stages of Botulism*

breaks, E. C. Dickson and G. E. Burke of Stanford University have isolated *B. botulinus*.

The disease from this source can readily be prevented by discarding all spoiled canned goods or by thoroughly boiling them before feeding to poultry or other animals. Boiling destroys the toxin of *Bacillus botulinus*, although sterilization under steam pressure is necessary to kill the spores of the organism. There is no evidence at present to show that the botulinus organism will produce its toxin in the body of man or domestic animals.



FIG. 2.—*Fowl Showing Typical Symptoms of Botulism*

Dr. R. E. Christopher, in charge of hog cholera control work in Iowa, resigned his position with the Bureau of Animal Industry January 12, 1920, to engage in general veterinary practice in Tama County, Iowa. Dr. Christopher had been in the Bureau service since 1908.

Dr. T. B. Harries, after serving faithfully in the great World War, has returned to Strathmore, Alberta, where he is in the employ of the Natural Resources Department of the Canadian Pacific Railway.

RECENT PUBLICATIONS

THE PATHOLOGY OF DOURINE, WITH SPECIAL REFERENCE TO MICROSCOPIC CHANGES IN NERVE TISSUES AND OTHER STRUCTURES. By Robert J. Formad. In *Journal of Agricultural Research*, vol. 18, No. 3, p. 145.

ABSTRACTS

OSTERTAG'S METHODS OF TUBERCULOSIS CONTROL. Eber. Deut. Tierärztl. Wchnschr., 1918, p. 395. Abstract in Monatsch. Prakt. Tierheilk., May, 1919, p. 571.

Eber in summing up the experiences with Ostertag's voluntary tuberculosis control methods, states that by consistent and faithful application of the procedure there is secured a rapid checking of the affection even in badly infected cattle establishments. However, there is not brought about an eradication of the disease. The procedure has not shown itself equally useful for all agricultural conditions; and besides, the results depend very much on the cooperation of the individual owners. Moreover, in the reintroduction of this procedure after the war, the following points must be taken into consideration: The establishments are given at least two clinical examinations each year. Of three yearly bacteriologic mixed milk examinations, two are undertaken in connection with the clinical veterinary examinations. All cattle affected with open tuberculosis are promptly discovered and removed. With young cattle as well as with older ones, care is taken to build up the body strength and raise the powers of resistance. Finally there is guaranteed to the cattle owner with the least delay a sufficient indemnity for the loss caused by tuberculosis.

L. T. GILTNER.

RESULTS OF GLANDERS CONTROL IN THE SIEBENBURG ARMY, 1917. Nuzeitig. Wiener Tierärztl. Monatsch., 1918, p. 336. Abstract in Monatsch. Prakt. Tierheilk., May, 1919, p. 568.

According to the experiences of the Siebenburg army, the eye test, on account of its simplicity and quickness, has proved itself indispensable. The obligatory malleinization must be extended to all the horse establishments and be repeated in a given time. In judging the mallein eye test an accompanying thermic reaction is of value. For clearing up doubtful reactions, the skin test is drawn on. The production of a concentrated mallein is necessary. The positive mallein reaction proves an established infection. The destruction of clinically latent glanders cases (only positive to mallein or blood test) is considered superfluous and from the farmer's standpoint unjustifiable. These latent forms can be considered harmless so far as spreading the infection is concerned if they show a normal body temperature after the disappearance of the mallein reaction

(for agricultural use in restricted districts). Through the simultaneous application of the eye test and the blood tests, the mistakes of one are corrected by the other.

L. T. GILTNER.

STUDY ON INFECTIOUS ANEMIA OF HORSES. R. Abelein. München. Tierarztl. Wchnschr., June, 1919, vol. 70, p. 389.

During a period of 4 months in 1917, infectious anemia was observed in a group of horses whose general hygienic conditions were excellent, except for slightly insufficient feed. The most striking symptom was remittent, intermittent, very high fever. It appeared suddenly, often rising to 41 degrees (106° F.) during the first day, persisted for several days with only a slight rise or fall of 1 degree and then quickly subsided; for example, in a single day the temperature dropped from 41.7 to 38 degrees. The temperature curve generally rose and fell abruptly with a level plateau. A period of normal temperature followed until there was a recurrence. Rather remarkable were cases where temperatures dropped to 36.6 (subnormal), followed by recovery. During the observation period of 4 months the greatest number of attacks of fever observed in the same horse was 4; maximum duration of fever, 13 days; minimum, 1 day; longest intermission between fevers, 2 months; shortest, 2 days.

Otherwise the symptoms were not striking. Only when the fever was high did the animals exhibit unsteady gait; they lay down in the stall. Sometimes the head was stretched out as in the beginning of strangles. In some of the animals before death there was edema of the chest, sheath, and legs.

In the beginning of the disease conjunctiva were pale red, often mixed with a slight brown or gray. After chronic illness this changed to porcelain-white. Eyelids not swollen, but the conjunctiva thickened, very moist.

During fever pulse was faint, up to 60, during fever-free periods, up to 48. Pulse rose 10 beats during easy walking and became arhythmic. During rest the apex beat seemed strengthened. Before death pulse rose rapidly to 120.

The nasal mucous membranes were reddened; in a few cases there was a very slight bilateral nasal discharge. Pressure upon the upper tracheal rings sometimes caused coughing. Digestion was disturbed only in very severe cases. Nothing abnormal found in genito-urinary system nor in the urine.

The pathological picture consisted practically only in the inter-

mittent fever, slight catarrh of the upper respiratory passages, heart weakness, emaciation, and later anemia, although anemia did not always develop.

Appearance of animals on autopsy is described in detail; nothing striking. W. N. BERG.

BACTERIOLOGICAL STUDY ON BRUSSEL'S DISEASE (INFECTIOUS BRONCHO-PNEUMONIA IN THE HORSE). Schroeder. Berl. Arch., 1919, p. 1. Abstract in Monatsch. Prakt. Tierheilk., May, 1919, p. 570.

The studies on the etiology of infectious broncho-pneumonia of military horses known as Brussel's disease, undertaken under the direction of Prof. Reinhardt, show chiefly that artificial infection by contact as well as by injection and ingestion of lung extract and nasal mucus was not successful. In the material studied there were found regularly bipolar bacteria, pure cultures of which did not produce the Brussel's disease in healthy horses. Therefore, the author believes that in the process of taking the infection, there are acting besides the bacteria predisposing factors such as influence of temperature, overexertion, youth and Belgian breed. In the purulent broncho-pneumonic processes, streptococci and staphylococci also appear to play a part. The infectious broncho-pneumonia has nothing to do with strangles. L. T. GILTNER.

DIARRHEA OF LAMBS. Oppermann and Lange. Deut. Tierärztl. Wchnschr., 1918, p. 519. Abstract in Monatsch. Prakt. Tierheilk., May, 1919, p. 568.

In the cases of scouring in lambs studied, colon bacilli and capsule bacteria (*Diplococcus capsulatus*) were shown to be causative agents, the bacteriologic differentiation of which is often difficult. Besides microscopic examinations, cultural tests were undertaken. The disease sets in a short time after birth; after 12 hours, at the latest, 2 days, there appears a severe diarrhea with febrile temperature (104.9–106.7°), the conjunctivæ show a diffuse dark reddening. The disease usually leads to death in from 1 to 2 days. Treatment consists chiefly in prophylaxis (disinfection, separation).

L. T. GILTNER.

ASSOCIATION NEWS

Proceedings of the Fifty-Sixth Annual Meeting of the American Veterinary Medical Association

Held at the Hotel Grunewald, New Orleans, La.,
November 17 to 22, 1919

(Continued from the March number.)

WEDNESDAY MORNING, NOVEMBER 19, 1919

The meeting was called to order by President V. A. Moore at 9 a. m.

THE PRESIDENT: The first item of business is the report of the Executive Board.

FURTHER REPORT OF EXECUTIVE BOARD

DR. MAYO: The following applications have been approved for membership: Dr. L. J. Bonner, Linville, Ala.; Dr. J. J. Jones, Jackson, Miss.; Dr. J. B. Monroe, Providence, R. I.; Dr. R. C. Lambert, Wichita, Kans. The Executive Board recommends that Dr. Harrington of St. Joseph, Mo., who graduated in 1919 from the St. Joseph Veterinary College, be admitted to membership under the suspension of rules.

DR. HOSKINS: I move the recommendation of the committee be approved.

(The motion was seconded by Dr. McAuslin and carried.)

DR. MAYO: It was recommended by the Executive Board that a special committee be appointed by the President to devise some means for an affiliation or connection between State and local associations and the American Veterinary Medical Association, this committee to report at the next meeting of the Association.

DR. KINGSLEY: I move the recommendation be approved.

(The motion was seconded by Dr. Hoskins and carried.)

DR. MAYO: The Executive Board recommends that the report of the Committee on Anatomical Nomenclature be received and laid on the table until the report of the work of the International Committee be received.

(It was moved by Dr. Hoskins and seconded by Dr. Moore that the recommendation be approved. Carried.)

THE PRESIDENT: I wish to announce the committee that was recommended and approved yesterday to consider the combination of the offices of Secretary and Editor of the JOURNAL. I will announce as such committee Dr. Stange, Dr. Munce and Dr. Hilton. The committee that has just been approved I will announce a little later. Are there any chairmen of any committees that have not reported?

REPORT OF COMMITTEE ON LEGISLATION

DR. W. H. HOSKINS: I am ready to report on the Legislation Committee.

Mr. Chairman, gentlemen, the Committee on Legislation has been active during the past year.

First—In aiding the passage of the bill that afforded the Bureau of Animal Industry veterinarians the increased amount of pay of \$240 provided for all those whose salaries were \$2,500 and less.

Second—In joining in support of the added sum for salaries of those in the Department of Agriculture that made it possible to add an additional \$120 to the salaries of many of the Bureau of Animal Industry veterinarians whose salaries were \$2,000 or less per year.

Third—The Department of Agriculture appropriation for the year ending June 30, 1920, contains an appropriation of \$100,000 that enables the Bureau to reestablish equine meat inspection that means the solving of the problem of two millions or more horses on the Western ranges unfit for any purpose save that of food, leather and other commercial purposes. This appropriation likewise affords an outlet for hundreds of horses on many farms—many that are lame, blemished, broken-winded, and are undesirable and unprofitable to keep for utility purposes and that are consuming food and forage that can be more profitably fed to other animals and lessen the cost of food to horse owners, thus contributing to their retained uses in the field of commerce.

Fourth—When the Volstead prohibition bill reached conference it was discovered that a provision permitting the veterinarian to prescribe liquors under like conditions as the physician had been omitted. Efforts to correct this defect were unavailing, as the prints of the bill in contention by the Senate and House conferees did not enumerate this as one of the points at issue. We were assured that the presentation of an amendment later covering this omission would meet with the approval of the House and Senate, as the omission was not intentional.

A bill known as Senate Bill No. 3011, introduced by Senator Calder of New York, planning to make the provisions of the Federal food and drug act the only standard of regulation for enforcement in any of the States, has received the attention of your committee. This measure would negative the acts of many legislatures that have established more exacting standards for foods and drugs within their commonwealths.

The Committee on Legislation of the American Medical Association and many food and drug departments of the different States have filed protests against its further consideration or passage. Your committee has filed a vigorous protest against it, as it would let down the bars in many States for the increased sale of domestic animal nostrums, cure-alls and mixed foods of doubtful economic value. This bill is resting in the Senate Committee on Agriculture and should receive our Association's disapproval and the individual opposition of every member.

While the War Department through its General Staff has agreed upon many points of Army reorganization that involves the Veterinary Corps and which will be presented in the next Congress, the probability of passing a reorganization bill for the Army until after the 1920 campaign is uncertain and improbable.

Your committee is endeavoring to keep in touch with all proposed Federal legislation that involves the welfare of the profession and its best interests.

Respectfully submitted,

W. HORACE HOSKINS, *Chairman.*

S. J. WALKLEY.

(It was moved by Dr. Moore that the report be received. Seconded and carried.)

REPORT OF LIAUTARD MEMORIAL COMMITTEE

THE PRESIDENT: Is there any other committee ready to report?

DR. BRENTON: I beg to submit the following as the report of the Liautard Memorial Committee:

In the absence of Chairman Ellis of this committee, this body, represented by Drs. Brenton, Dalrymple, William Herbert Lowe and W. Horace Hoskins, report that they have several forms of a memorial under consideration.

The suggestion that it take the form of a painting of Alexandre Liautard in the Saddle and Sirloin Club gallery is not approved.

We therefore report progress and recommend the continuation of the committee.

Respectfully submitted by the committee,

ROBERT W. ELLIS, *Chairman,*

W. HORACE HOSKINS,

S. BRENTON,

WM. HERBERT LOWE,

W. H. DALRYMPLE.

(It was moved and carried that the report be received.)

REPORT OF COMMITTEE ON HISTORY

DR. R. C. MOORE (St. Joseph, Mo.): Mr. Chairman, the Committee on History is ready to report as follows:

Owing to the long distances intervening between the residences of the members of this committee, the Chairman found it very difficult to consult with the members regarding the general plans to be pursued, so has found it necessary to lay out such plans as he could and ask the members of the committee to carry out such parts as he saw fit to request, and so far as this has been carried out the members to whom certain portions of the work was assigned have responded heartily.

The plan selected was as follows: To entrust to one member the compiling of the history of the Veterinary Service in the American Army, to another member that of the B. A. I., to another the history

of the profession in Canada, to another a history of the development of the profession as a result of the efforts of our heroes who carried the banner as pioneers in the early days of our country. Then by appealing to the various State Associations we hoped to secure a history of the profession in the several States, including the pioneers of the States, the dates of the organization of their State Associations, the enactment of their laws pertaining to veterinary practice and such other facts as might be of interest; and lastly, to obtain through friends and representatives of our educational institutions now in existence, and those of the past, facts pertaining to their organization, development, period of existence and probably a roster of their graduates and later such other facts as may present themselves, so that when the time comes a committee can compile a book from the data thus procured that will be of real value to the profession.

The procuring of the data of the Army was entrusted to Major A. L. Mason and through his efforts, assisted by Major Olaf Schwarzkopf, we are able to present a splendid sketch of the Army veterinarians from the time of the Revolution to the date that the United States entered the World War.

Dr. U. G. Houck kindly consented to take care of the B. A. I. section, and his elegant report herewith presented speaks for itself.

Dr. Charles Higgins gladly accepted the task of furnishing a history of the profession in Canada in all its details, but has not had sufficient time to complete his work.

I expected to obtain through the efforts of Dr. George H. Berns a history of the pioneer banner bearers, but owing to a protracted illness of your Chairman at the time I could have pushed this phase of the work and that pertaining to the State Associations and educational institutions I was unable to carry this phase of the work along, but hope the start that has been made will prove of service to future workers.

We recommend that a committee be provided to continue this work, with the hope that in a few years sufficient data may be procured to enable the publication of a book that will prove both a pleasure and a benefit to the present and future veterinarians of America.

R. C. MOORE, *Chairman.*

U. G. HOUCK.

DR. MOORE: Now, I am going to ask Dr. Houck to read a portion on the outlines of the work that we have been able to compile this far.

DR. U. G. HOUCK (Washington, D. C.): Mr. President and fellow members of the A. V. M. A., we have here some material which is to be submitted and if considered worthy will be later published in the JOURNAL. Therefore you will have more time to read it than you will to listen to it at this time, and I am only going to make a few remarks in submitting this:

First, we have here Major A. L. Mason's report, in which he

collaborated with Major Schwarzkopf, on "The Historical Development of the Veterinary Service in the United States Army." In this report he refers to various subjects which I will just mention in connection with the introduction. He refers to the period of farriers from 1792 to 1862; next, the irregular veterinary service during the Civil War; the after-effects of the war on the service; the period of transition from horse doctor to veterinarian; veterinary supply tables for the Army; the veterinary surgeon in the Indian campaign; pioneer work in Army veterinary legislation; the Army veterinary bill of 1887; the Army veterinary bill of 1894; the Army appropriation bill of 1901; the Cuban War up to December, 1898; the Philippine War, 1899 to 1902; official divisions of Army veterinarians. I have read over part of this report and find it very interesting indeed, but as it will appear in the JOURNAL, no doubt, you will have an opportunity to read it.

In submitting my report on a historical sketch of the United States Bureau of Animal Industry, I will say that as a member of the committee appointed to compile a history of the veterinary service in America I was invited to give my attention to the facts bearing on it. I appreciate the honor of being a member of this committee, but when I accepted I did not realize what would be necessary to accomplish the undertaking. Before I had progressed far I realized that I would not have the time to do the reading necessary to collect the information for a complete history, and I decided to limit my efforts to the preparation of only a brief historical sketch of the bureau which has become such a large, important organization in the Department of Agriculture.

There were so many important conditions and events prior to the establishment of the Bureau of Animal Industry that created the need of a strong veterinary organization operated under the patronage of the National Government. There were so many important duties committed to the Department, and it has accomplished so much in the protection of property and the alleviation of animal suffering, in guarding public health and preserving and extending our export trade, that in preparing this paper it seemed expedient to divide the subject into epochs, as follows: First, the establishment of the Bureau in 1884. Second, the administration of Dr. D. E. Salmon, the first Chief of the Bureau, from 1883 to 1905. Third, the second Chief, Dr. A. D. Melvin, from 1905 to 1917; and fourth, the administration of Dr. J. R. Mohler, the third Chief of the Bureau, from 1917 to the present time.

I regret that I have been unable to complete the sketch in time for this meeting, as it was necessary for me to do this work in connection with my regular official duties. I have been obliged to confine my efforts to a review of the conditions of the first epoch. If continued on the committee I shall probably be able to complete my task before the next meeting of this Association.

In the paper that I have prepared, after the first introduction, I have taken up the subjects and given a brief sketch of (1) contagious

pleuro-pneumonia, which was the most important factor leading to the organization and establishment of the Bureau of Animal Industry; (2) the export trade in cattle and meats; (3) hog cholera; (4) animal transportation, domestic and foreign; (5) meat inspection; (6) quarantine; (7) the opposition that the bill met when it was presented to our Congress. I think that is all I will read this morning. The time is limited, and you will have an opportunity to see these historical sketches published in the JOURNAL.

(Motion was made by Dr. Hoskins that the report be received and the committee be continued. Seconded and carried.)

THE PRESIDENT: I am sure we are very pleased with the progress that has been made in this historical review.

I think that owing to the lateness of the hour we will defer calling for other reports until our next meeting, and I hope that all of the other committees will be ready at the next general session to present their report.

The program of the morning consists of the report of the Special Committee on Abortion Disease. You will remember that last year there was a special committee appointed to investigate this special disease, and that committee is reporting here by separate papers by different members. Dr. Eichhorn, have you any report?

(Dr. Eichhorn read the report of the Committee on Infectious Abortion Disease of Cattle, as follows:)

GENERAL REPORT OF THE COMMITTEE ON INFECTIOUS ABORTION DISEASE OF CATTLE

GENTLEMEN: In considering the wide scope of the work with which this special committee was confronted, it was primarily deemed essential to group the various phases of the problem under various headings to cover the entire scope of the work in a systematic manner.

With this in view the committee has formulated an outline for the study of the condition which has been termed infectious abortion as follows:

1. Abortion is the expulsion of a dead fetus from the uterus.
2. All abortions of an infectious character are not due to one specific virus.
3. A certain virus may be the dominant infection in the genital system and may be the prevalent cause of abortions in a given herd or country.
4. What are the conditions within the uterus associated with the expulsion of the fetus, and in what sequence do they develop?
5. Abortion is not the disease, and the inclusion of this term as a part of the name is confusing and misleading and should be discarded.
6. The various infections capable of causing abortion should be studied and their relative importance determined.
7. In the elucidation of the above principles, studies in the field of pathology, etiology, symptoms, diagnosis, prevalence, nomencla-

ture, treatment and control will have to be made and the existing and prospective literature on the subject analyzed. The papers and the studies of the kind indicated should be presented to the Association from time to time as interim reports of the committee.

An analysis of the outline would show that the study of abortion due to specific causes has been well provided for in the program, but on account of its comprehensive scope at the best only part of these investigations could be taken up by the members of the committee and will be presented as individual reports. The subjects taken up by the members of the committee are as follows:

The Diagnosis of Bovine Contagious Abortion, by Dr. C. P. Fitch.

The Influence of Health of the Calf upon its Fertility at Breeding Age, by Dr. W. L. Williams.

The Bacteriology of the Reproductive Organs of the Aborting Cow in Comparison with that of the Aborted Fetus, by Dr. Ward Giltner.

A Review of Several Publications on Infectious Abortion Disease, by Dr. E. C. Schroeder.

While at first glance it would appear that the work in the past year has not materially furthered our knowledge with regard to the many obscure phases of this condition, nor have means been developed by which the tremendous economical losses resulting from abortion disease could be materially checked, nevertheless the committee has prepared a working basis by which the studies may be systematically carried out and which without doubt will result in the future in the material advancement of our knowledge with regard to this problem.

Aside from the activity of the committee, several very important publications have appeared on this subject, and a member of this committee has kindly consented to review the most important literature, which, together with the individual reports of the members of the committee, will furnish the members of the profession all the new knowledge which has been gained in the study of the disease.

The committee is of the opinion that the Association should continue to appoint a committee for the study of infectious abortion disease of cattle, as it is impossible even to forecast the time which will be required for the completion of the skeleton outline prepared by this committee; and furthermore, that cooperative work carried on by such a committee would result in a closer application and specialization in the problems and also would prevent a great deal of duplication of work which has been so very common in the past.

Another suggestion which the committee offers is that the Association appropriate a sum not to exceed \$500 for defraying the expenses of the committee, as it is essential that the committee should meet as often as circumstances would permit for the purpose of reviewing and outlining the work and also for the purpose of discussions which are essential and of great advantage for the effective working of a committee of this kind. It is hoped that the continuance of the work will ultimately lead to definite results which we

are seeking to obtain with regard to the tremendous losses sustained from abortion and its allied affections.

A. EICHHORN, *Chairman*,
E. C. SCHROEDER,
C. P. FITCH,
W. L. WILLIAMS,
WARD GILTNER.

(A motion was made by Dr. Hoskins that the report be received and the committee be continued. Motion seconded and carried.)

THE PRESIDENT: Dr. Eichhorn, I noticed that the sequence of papers was different as outlined in your report than given on this program. Does it make any difference in the general comprehension of the subject whether we call on them in the order given here or in your papers?

DR. EICHHORN: I don't think it will make any difference, because some will be presented in title and some by abstract.

THE PRESIDENT: The next will be by Dr. Giltner.

(Dr. Giltner read paper on "The Bacteriology of the Reproductive Organs of the Cow and its Relation to that of the Meconium of the Calf," which is published elsewhere in this number of the JOURNAL.)

THE PRESIDENT: You have heard this paper. As it is a part of a series of papers, do you wish to have it discussed at this time, or do you wish to wait and have it discussed?

DR. HOSKINS: Wait until the others are presented for discussion.

THE PRESIDENT: It is suggested that we wait, and if there is no objection the next will be on "Infectious Abortion Disease," a short review of several publications by Dr. E. C. Schroeder.

DR. EICHHORN: Mr. President, I move that this paper be read by title. Although I believe this paper is of the greatest value to the members of the profession, as it affords an opportunity to see in abstract form everything which has been published in the past year, in view of the short time we have I suggest that it be read only by title.

THE PRESIDENT: If no objection, it will be so ordered.

(Dr. Schroeder's paper will be published later.)

THE PRESIDENT: The next is "The Diagnosis of Bovine Contagious Abortion," by C. P. Fitch.

(Dr. Fitch read his paper, which appeared in the JOURNAL for February, 1920.)

THE PRESIDENT: The next paper, I think, Dr. Eichhorn gave the title in the report. The program says the subject is to be announced. Dr. Williams, do you want the paper announced?

DR. W. L. WILLIAMS: Mr. President, the contribution that I made on "The Influence of the Health of the Calf upon its Fertility at Breeding Age," is too long for presentation in full. I have been unable to abstract it in such a way that I feel that I will be understood. Our time is very short, and the next paper upon the program, that upon "White Scours or Calf Scours," is related and

fundamental to what I have attempted to place before the Association in this contribution. I therefore ask, under the circumstances, that it be accepted by title and referred to the JOURNAL for publication.

THE PRESIDENT: You have heard the suggestion by the author of this paper. There being no objection, due to the shortness of time, we will hear the next paper, "White Scours or Calf Scours," by Doctors Williams, Hagan and Carpenter.

(Dr. Williams's papers on "Influence of the Health of the Calf upon its Fertility at Breeding Age" and on "White Scours or Calf Scours," will be published later.)

THE PRESIDENT: The next paper will be "The Abortion Disease and its Control," by Dr. J. F. DeVine.

(Dr. DeVine read his paper, which will be published later.)

THE PRESIDENT: The next paper is by Dr. Potter on "Field Observations in the Control of Abortion Disease."

(Dr. Potter read his paper, which will be published later.)

DISCUSSION OF PAPERS ON INFECTIOUS ABORTION

DR. WILLIAMS: There are some very interesting points in Dr. Potter's paper which are not wholly clear to me, and upon which I would greatly appreciate an explanation by him.

On page 2, paragraph 2, line 15 of his manuscript, I find the statement: "The known difficulties of treatment and the lack of dependable immunizing agents necessitated that preventive rather than curative methods be taught."

On page 4, paragraph 3, he states: "Especial emphasis was laid on the immunity conferred by the disease, which caused it to subside in herd after herd."

In the first statement he denies the existence of a reliable immunizing agent, and in the second statement turns about face and declares the disease itself such an immunizing agent.

If the disease is readily transmissible and one attack regularly confers immunity, why may not all the cattle of a State or Nation be simultaneously immunized by universal compulsory inoculation as in smallpox? The loss of a single calf crop would certainly be a trifling price to pay for the elimination of abortion.

In his control scheme on page 5 Dr. Potter says: "All aborters and those threatening abortion can then be removed to a separate inclosure." Then after they are recovered he states they may rejoin the herd and at the time when grazing is ample he adds: "The cows then go out clean and there are none to disseminate infection, and as most of the aborters will have become immune the disease will subside."

I would like to ask Dr. Potter if, in his judgment, cows may not occasionally expel an embryo or fetus unobserved? If so, is there any danger to the herd from such a cow, and how remove the danger? Will she recover and become immune in the herd as well as in quarantine? Does it ever occur in a large herd of range cattle

that a fetal cadaver is found and the cow which has expelled it can not be identified? Will the destruction of the fetal cadaver eliminate the danger to other cows? Does Dr. Potter believe that all cows which have "abortion disease" abort, or do some infected cows calve? If they calve are they safer in the herd than aborters, and why?

On page 6, Dr. Potter states: "The cow that produces a healthy calf each year, in spite of the presence of infection, and the cow that acquires a strong immunity following a single abortion are kept to transmit these desirable tendencies to their offspring."

Why, if this plan is pursued, should there be left any abortion in existence? If those cows which do not abort grow calves which will not abort because of an inherited power of resistance, and the calves from those cows which have aborted once and are immune inherit immunity from their mothers and therefore do not abort, why should we worry about abortion at all? Why is it that the presence or absence of the infection should alike produce immunity in both cow and fetus?

On page 5, Dr. Potter states: "The experience of the writer leads him to believe that the disease among range cattle is pure abortion disease. This belief comes from * * * the relative infrequency of the common complications. Retained after births are not nearly so frequent as among dairy cows."

What does Dr. Potter mean by "pure abortion disease?" Does he hold that in a given case of abortion one germ causes the expulsion of the fetus and another germ prevents the expulsion of the after-birth? Is there a "contagious abortion disease" and an "infectious retained-afterbirth disease" working simultaneously in the same animal?

On page 12, Dr. Potter states: "The question of the natural period of incubation is one on which we might with profit have more information." He then cites two instances in which he claims to have definitely fixed the period of incubation in one group at three months, in the other at five months. Just what does Dr. Potter mean by "incubation period" in abortion disease? Is it the period elapsing between exposure and the expulsion of a fetal cadaver? If such is the case, would the period of incubation of syphilis in woman be the time elapsing between exposure and the expulsion of a syphilitic fetal cadaver? If she aborted three separate times owing to uterine syphilis would the period of incubation of the abortion disease close with the first, second or third abortion?

Or take a heifer now in our hospital about eight months after conception. Her fetus died but was not expelled. Seventeen months after conception she came to the hospital and we removed nearly the entire fetal cadaver through the cervical canal. But a humerus and a radius of the fetus remained in the apex of the uterine horn, and at about 19 months after conception we performed laparohysterotomy and removed the two detained bones. I wish Dr. Potter, who has evidently given much thought to the incubation period, would state what the incubation period was in this case,

that is, when the period terminated. I do not know when the exposure occurred. Did the incubation period terminate with the death of the fetus at about 8 months, the removal of most of the cadaver at about 17 months, or the removal of the remnant of the cadaver at about 19 months?

If a cow is infected with abortion disease and yet gives birth to a vigorous calf at 285 days, what is the period of incubation? Is there one period of incubation each for the cow and the fetus?

In the two groups of cows with incubation periods of 3 and 5 months respectively, were both groups due to the same germ, and if so, what evidence of identity has Dr. Potter to submit? Were the exposed pregnant cows free from all infections at the time of exposure capable of causing abortion? If so, upon what evidence is his statement based?

In the second paragraph on page 14 Dr. Potter states: "Our present medical knowledge is altogether inadequate for controlling abortion disease." Ten lines beyond he says: "The more the writer studies the situation the more firmly convinced is he that the disease can be controlled." How does he reconcile these two statements?

DR. POTTER: I would like to say that this analysis reminds me of what we sometimes see in legal cases, where the lawyer presents a hypothetical question of about 45,000 words for the unlucky defendant.

In the 1916 meeting of the United States Live Stock Sanitary Association Dr. Lamb of Colorado presented a short statement on range abortion in which he outlined many of the difficulties in controlling abortion disease in cattle. I had the good fortune of making a trip through the West, and I studied as best I could by consultation with stockmen and veterinarians of that section the disease under their direction. Now, Dr. Williams' statement goes into all of the difficulties and all of the discussions that we have been having for these many years concerning the minor details of abortion disease.

In answering those, all I wish to say is that apparently, as far as anybody can tell, the plan works. We control the gross infection; we take care of the aborting cows; when controlling our abortion in such a way we concentrate the abortions in the time that the abortion can be controlled. Any of you know that for a large part of the year you can not possibly handle those animals in any way, and this is only an effort to meet the difficulties of the situation, and as far as we can tell, it works.

DR. WILLIAMS: May I give just a word of explanation? I asked these questions rather that they should go on record, and I know it would be unfair to expect Dr. Potter to answer them.

DR. C. A. ZELL: Mr. President, I am just thinking about the curative agents and the abortions we have, and I think one product like phlemin is very much neglected. I think it could do a lot of good in the abortion of cattle, using it not only as an intravenous injection, but also injecting the uterus and vagina. I did some experiments, but they are so few that I really can not draw any conclusion, but I

believe that men like Professor Williams and Dr. Eichhorn of the committee have every opportunity to try it out, and I believe that they may have some good success.

THE PRESIDENT: I believe that you all have questions to ask, but the time is not sufficient. We must leave here, and the balance of these papers according to rule will go over until the end of the session. If there is no objection to that, we will entertain a motion to adjourn until 2 o'clock sharp. We have a heavy program.

Adjournment.

WEDNESDAY AFTERNOON

The meeting was called to order at 2 p. m., President V. A. Moore, presiding.

DR. L. E. DAY (Chicago): Mr. President, this morning in Dr. Eichhorn's report he suggested that \$500 be given to further the work of the Committee on Contagious Abortion. I move you at this time that this recommendation be referred to the Budget Committee.

(The motion was seconded by Dr. Hollingworth and carried.)

INTERNATIONAL VETERINARY CONGRESS

DR. MERILLAT: I thought it appropriate at this time to bring before the Association the advisability of providing the veterinarians of the world with a veterinary congress in 1921, and in discussing this subject at the meeting of the Veterinary School of Alfort it was freely expressed that the veterinarians of Europe were so concerned in their temporal welfare that it might be a long while before they would feel able to convene this congress. At that time I stated to Professor Vallée and others that I would bring the matter before the American Veterinary Medical Association, suggesting that you have the meeting convene in the United States, and among those men it met with universal approval. Therefore, Mr. President, I move you that a committee of five be appointed for the purpose of corresponding with the veterinarians of the civilized nations, to obtain their coöperation in this ambition of the American Veterinary Medical Association.

(The motion was seconded by Dr. Kinsley and carried.)

PRESENTATION OF PAPERS

DR. WINCHESTER: This morning's program was not finished, and there are some papers that should have been heard this morning. I move you, sir, that we adhere to the printed program and that those papers that were not heard this morning be heard at a general session which may follow.

(The motion was seconded by Dr. McAuslin.)

THE PRESIDENT: That was decided this morning, that the papers that were unread at this morning's session will come on Friday.

The first paper on the program this afternoon is "The United

States Army Veterinary Corps Service of the Interior," by Col. C. J. Marshall, Philadelphia, Pa. (Applause.)

(At the request of Col. Marshall, Secretary Mayo read his paper. It was published in the JOURNAL for February, 1920.)

THE PRESIDENT: The program calls for the discussion at the end of this series of papers. If there is any question, however, that is in the mind of any member relative to the facts as presented, in order that this may be clear, I think it would be proper that such question might be asked, but that no expression of opinion or discussion should take place until the time for that. Is there any question of that kind in regard to explanation, or question of facts as presented in this paper, that was not clear to those here?

The Chair feels that the importance of these papers does not justify his calling the time limit unless it should be necessary. There is time, I think, for these papers to be presented, and unless it is the wish of the Association that time limit should be adhered to, the Chair will ignore that for this part of the program. Hearing no objection, it will be so ruled.

The next paper is on "The U. S. Army Veterinary Service in France," by Col. H. E. Bemis. (Applause.)

(Colonel Bemis read his paper, which appears elsewhere in this number of the JOURNAL.)

THE PRESIDENT: Are there any questions as suggested in the previous paper?

The next paper called for the use of the lantern. As the lantern needs a little adjustment first, I wish to call upon the fourth speaker—to reverse the next two—if there are no objections. Then, possibly the lantern will be ready. I will ask Major Lytle to present his paper on the meat inspection. (Applause.)

(Major Lytle presented his paper on "The United States Army Meat Supply." It will be published later.)

THE PRESIDENT: The next paper is on "The British Army Veterinary Service," illustrated by certain lantern slides, by Col. D. S. Tamblyn. (Applause.)

(Colonel Tamblyn read his paper, which appears elsewhere in this number of the JOURNAL.)

THE PRESIDENT: Colonel Tamblyn will show the slides this evening. I will now call on Colonel White to open the discussion.

DISCUSSION ON ARMY PAPERS

DR. WHITE: Gentlemen, it was my opportunity to serve my Government as best I could in the late unpleasantness with Germany. An officer of the Regular Army Veterinary Corps wandered out to me in the West in May, 1919, and asked me if I would accept the position of examiner for the State of Ohio for those who desired to join the then Veterinary Officers' Reserve Corps. I examined something like 200 men, 150 of whom complied with the requirements then in force, donned their uniforms and went into the service.

Having reached almost the half-century mark, I felt that that

would be my slight contribution, because I felt that I could do nothing more. My military experience, I will admit, had been limited to four years in the National Guard, and as a member of the cadet regiment, where I never reached a very exalted height, at least not beyond that of the captaincy of an infantry company. At the request, however, of the Surgeon-General, I came to Washington and attempted during the hot summer of 1919 to do a piece of constructive work.

We had absolutely no nucleus around which to build. It was necessary, therefore, in this emergency for us to form a nucleus. The time was fleeting. Hours, even, were precious. Men were dying along the western front while we were attempting to organize over here, and there is no truer saying than the one made by the British officer who was sent here at the request of the Surgeon-General, that every hour of time lost meant that thousands of brave men in the British and French armies would die.

The Surgeon-General made no effort to organize a veterinary service until this country had been at war 4 months. Authority from the War Department was not obtained for the organization created in the interim to function until 8 months had passed after we had entered the war. No adequate organization of the veterinary service overseas had been formed until 2 months and 7 days before the signing of the armistice. So, gentlemen, we got a very late start. I do not wish to apologize for the Advisory Board of which I was a member, or for my own actions. I think, personally, I made every possible mistake that was to be made. These mistakes, however, were due to our lack of the type of military experience which the occasion demanded. They were by no means confined to me, to the Advisory Board, or to the Veterinary Corps, but to every branch of the service.

In 1914, when the great conflagration was consuming Europe, this country had available 400 cannon, a number of guns that would be lost in a single day's battle at the front. We had enough ammunition available to last 20 minutes as it was used at the front. We had a manufacturing capacity of about 50,000 uniforms per year. We had no air service whatsoever. There were not a hundred men in the United States who could run flying machines, and most of these were circus performers. We had no general staff in the European sense. The officers in the Regular Army who had ever commanded as large a body of troops as a division you could count on the fingers of one hand. A great majority of those even who had attained the rank of general had never commanded more than a regiment. If I am exaggerating here, I wish some of you regular officers would correct me. These data are not original with me. They came to me from an officer of the Regular Army who had seen some 40 years' service.

That was our beginning. We had available in the Army approximately 5,000 officers. Our National Guard was a quasi-political organization. When the armistice was signed we had nearly 200,000

officers, and obviously, among those 200,000 the men did the best they knew how. We must remember that in this emergency everybody did the best he knew how. In my 11 months which I spent in Washington I saw no evidence of political or fraternal favoritism. Perhaps I should cite you some concrete instances.

It would become necessary to appoint two division veterinarians. These men carried, according to the schedule, the rank of major. We found, however, that it would be impossible because the Adjutant General of the Army would not allow us to appoint majors only, but with each major must be appointed a certain number of captains and a certain number of first lieutenants. Our plan generally was to promote those first who were in uniform. We didn't know, personally, very much about the men in the Regular Army Veterinary Corps. We left the choice to a representative of that Corps who was at that time in the Surgeon-General's office, and in no case where he recommended that a regular officer be promoted did we for one moment demur.

Then, secondly, we chose men from the Veterinary Officers' Reserve Corps. They were all second lieutenants, and there it was a good deal like drawing cards in a poker game. Therefore we appointed a special committee of two civilians and one medical officer to select from the Veterinary Officers' Reserve Corps and from the civilian veterinarians of the country men who in their opinion were competent to assume the higher ranks. We followed, as best we could, the advice of this committee.

Now, in regard to the Advisory Board. As far as that is concerned, we were after nothing but this, and we still stand on that platform. We want to establish in the United States Army an adequate and efficient veterinary service, and we have a selfish motive in that, which is this: I firmly believe, gentlemen, that if this is accomplished and we have in the Army a corps which is respected in that service and respected by the Nation, every veterinarian in the United States will be benefited thereby. (Applause.) That is where we stand.

Gentlemen, I have faith in the veterinary profession. I believed firmly in the summer of 1917, as I do now in the winter of 1919, that the veterinary profession, as a whole, will make good at any job it is put at within its province to perform. I firmly believe that, and the experience of this war has demonstrated to any "Doubting Thomases" that fact, and I am informed by credible authority that the Chief of Staff of the United States Army and the late Commander-in-Chief of the American Expeditionary Forces have each given testimony that they now realize that the veterinary profession is able to perform its professional functions in the Army as well as out of it, and are willing to grant to us in the United States Army of the future what we acquired in the late war. (Applause.)

THE PRESIDENT: The next speaker is Colonel Merillat. (Applause.)

DR. MERILLAT: Mr. President and members of the Association: As a review of what happened in the A. E. F. hospital, the report

is pitiful. We did make mistakes, lots of mistakes, but those of you who were not in France cannot in any possible way form a least conception of the obstacles that the veterinary service had to undergo there, and in spite of that, I never heard a whole lot of complaint. We didn't have time.

The facts are, gentlemen, as far as my perspective went, that the veterinarians of the United States Army, constituted of men of the permanent Veterinary Reserve Corps, in France made good. They started against obstacles, as I said before, which were difficult to describe. I will relate my experience in the First Army. Really, an officer has no right to speak, because so often the viewpoint of an officer is so small. He has no right to make very many conclusions about what happened. A little officer who has charge of 500 horses, or 200 or 300, who will judge what has happened by his viewpoint—and perhaps he has never saw anything else—why, he is making a guess.

Now, I don't intend to speak about a thing except what happened in the First American Army, an army composed of three army corps and about 20 divisions. It was organized April 1, 1918, and functioned until February 23, 1919.

What happened there, I have a fairly good idea of. The First Army officially on record began August 7, but I was ordered to headquarters on August 1 from Paris, and went by train to the little town of La Ferte on the Marne River as far as the railroads went. I reported to the Chief of Staff who was organizing the headquarters of this new, great big First Army, the first army that ever was organized in the history of the United States. I reported to him as the Chief Veterinarian in company with an officer who ranked as major also, who was Chief Remount Officer.

You will remember the dates—that about August 1st the American Army had been in operation—it was the Second Battle of the Marne—since the 14th of July, so it was now two weeks that they had been fighting the hardest battles in the history of the world. The American Army at that time was under command of the French Army and was constituted of the First Army Corps, commanded by Lieutenant-General Liggett, and some scattering divisions here and there that were being sent in from time to time.

Getting off at the railroad, we reported to the Assistant Chief of Staff, and we were told that the horse condition was very, very bad, that he was very glad to see us. My! I never saw a more pleased man than Colonel Barber when we reported to him to help.

Remember, the First American Army went into the Battle of the Marne without a veterinary service, and we came there on the 1st of August, after two weeks of hard fighting, to help unscramble the terrible turmoil that had occurred from such a thing as that. Our forces were on the Vesle River, as you will remember, in the Soissons triangle between Soissons and Château Thierry. They had railroads between Soissons and Reims, a pretty straight line. The rest of the line was a team base. There was a line of

horses and men and the dying, dead and abandoned. How many, nobody ever counted. I was probably the only surgeon to be found in France. I am one of the men here known as surgeons, and we were supposed to straighten that thing right out, fix it right up. You know that was mighty difficult to do, but still we didn't back down. With the assistance of what veterinary personnel we had, and the hospital that was on the battle field, we succeeded in a few days in clearing up that great area of disabled horses and in shipping them to a hospital which we formed in the rear.

Not knowing how long we were going to stay there, we prepared for a more or less permanent stay. On the 14th of August we were told to get ready to move—where, nobody knew. On the night of August 14 we had to drop everything. We were getting machinery nicely going when we had to move. We were moved 200 miles to Neufchâteau, preparatory to the battle of St. Mihiel. They don't tell us those things in the war, you know. There we soon learned that our job was to create an evacuation station, to look after the veterinary service and other operations.

Remember, during this time we were under the Remount Service. I remember we got a letter from Colonel White—a pretty snappy letter—wanting to know what in the deuce was the matter. The Colonel didn't know that I was still under Remount Service. We were working under the Remount Service. We planned stations, collecting posts, division corps and army stations, to take the animals that would need evacuation, and created a pretty fair machinery out of borrowed troops, parts of troops of cavalry, labor companies, etc. There was one veterinary outfit that we took from the S. O. S.

COLONEL WHITE: Stolen. (Laughter.)

COLONEL MERILLAT: It was Major Blair's outfit. In the battle of St. Mihiel there was something like 4,800 horses that we put up. The machinery worked well, but we were not allowed to use railroads and had to walk horses over the country, and already we had formed some sort of a workable organization.

No sooner was this over than we got another order to move to Verdun, preparatory to the great battle of the Argonne, where the First Army now had a horse effective of about 93,000 animals.

It seems that Colonel White saw, when he came to visit the famous town of Ypres, the result of moving this great army to this new sector, without adequate men to take care of the disabled and sick animals, without adequate transportation to send them back to the veterinary hospitals. I know when Dr. White came to the First Army he had a bad impression of me, but when he looked over the shell-shot and wounded horses and saw the inadequate personnel we had to take care of them with, he was charitable enough to pardon me for all the ugly things he saw.

From that time on, which was now the 26th of September, with an adequate personnel, the First Army built a very creditable veterinary service. The records of the First Army, when they come to

Colonel Stancliffe, I am going to be proud of, and I want you to read them. I would like very much for you to take a great deal of pains with the files of the First Army and see whether after the 26th of September we didn't have a pretty good veterinary service. We had each mobile section where it belonged—and here I am going to speak about something else.

I got an awful roasting from Colonel White. He said the mobile section was 40 miles behind where it belonged. That was the only place you could put it. You know the mobile section belongs in front. One of the greatest troubles that I had in my organization was to get these placed, but the trouble was not of the division's making. When a division is located in one place for three or four weeks, and is told on an hour's notice to move, the horses that can't walk can't move. Therefore, who is going to take care of it? Of course the mobile section had to stay back, because there are two or three hundred horses that can't move. The division moves 40 kilometers. The chief comes along and finds that we are not there. Well, the chief didn't supply us with means of sending the horses. It takes a machinery that is working together all the cogs to prevent calamities. When the Second Division found itself in its nice little home on a farm with 190 horses, the Colonel was very mad, but there was no way at that time for this division to relieve them.

So, right here, in getting up your regulations, don't forget that the division veterinarians must be taken into confidence. They must be one of the first men to know about the moves. That was one of the big sins of omission in the A. E. F. In the division the veterinarian was the horse doctor. Sometimes he was just allowed to be around. He was back at the mobile section. Some of them never went up to headquarters.

As a matter of fact, the veterinarian holds a position so important, as far as army mobility is concerned, that he ought to be one of the first men that is taken into confidence and told where every echelon is to go, so that he can go ahead of everybody and plan to pick up these straggling animals and provide means to get these to a central place and avoid these calamities. They used to say that they could tell the way the division went by the dead and disabled horses along the road. It was a very simple matter to trace us because our division veterinarians would go along and you could see the horses straggling along the road.

Now, I was getting head of my story. We had on the 26th of September the division mobile sections where they belonged. We had behind each group of divisions in the Army Corps evacuation stations, manned with about 100 men, behind the corps. We had three big evacuation stations where we could load at our leisure, and in these two battles, as Colonel Bemis has told you, we evacuated 23,000 horses.

There were a lot of difficulties, but there was no wailing. We had no medicine; oh, no, of course not. It was down at the depot in St. Louis, and there were no bottoms to take it to us. It was neces-

sary to ration our horses less. We did not have an adequate supply of medical supplies in France. We had a lot more than the veterinary officers got. Some of them didn't have the right experience and didn't get the medicine that was there for them. Toward the last of the operations medicines were plentiful.

Now I want to say a word in detail about the Third Army. The Third Army was formed of 9 divisions taken from the First Army, and there were 20 per cent males in the horses in the First Army. I can't quite separate gypsy tactics from the horses. When Foch said that we were to be ordered out, it was a madhouse. The order said, "You must go forward with a 100 per cent army, men, transportation, etc., and you must make a certain objective every day, and be ready to take offensive in 48 hours."

Our army was located close to Verdun. Transportation never existed in that army after the Battle of the Argonne. We found that we must move 26,000 horses in 24 hours. Those are the horses, in part, that Colonel Bemis got from me. The order read, "You must fall in the spirit of this order and give the best horses to the Third Army." You can't make a man give a good horse when there are no good ones. You can't separate the gypsy tactics from the horse business. Colonel Bemis got all the mangy horses there were in the First Army. There were no more mangy horses in the First Army after he got his supply. (Laughter.)

The officers fought evacuation to the finish. We had to pry horses away from them, and consequently they always had a large per cent of mange.

And now I want to say a few words about S. R. 70. S. R. 70 was a failure in France, and was criticized by staff officers justly. It pays too much attention to a division and not enough to an army.

Another very bad mistake in the S. R. 70—Colonel White knows this is my pet kick—is that the mobile section was not an individual. It had to be connected up with something else for rations. That is serious, because this outfit is always hungry. They had to steal all they had to eat. The fact is we were officially attached to the headquarters' troop, and they never were there, so they couldn't draw their rations there.

COLONEL WHITE: The veterinary profession is not to blame for that. Colonel Stancliffe will bear me out. We wanted to make the mobile sections self-contained so that they could be moved anywhere, and in the supply tables which I made up we provided stoves, paraphernalia and everything, but the general staff attached to the train for rations found that that wouldn't work over in France. However, we weren't to blame for that.

COLONEL MERILLAT: Another mistake that was made by Colonel Bemis was that the first six divisions did not have any division veterinarian. They were without any head veterinary service. The Second Division had Sid Montgomery as Chief Veterinarian, and he told me that he was a graduate of Fort Riley. He ought to be able to tell the veterinarians how to treat horses. He sure ought to make

a good veterinarian. He was promoted to a full colonel after that.

The Fourth Division got Major Mitchell very late in the operations, and the Twenty-sixth had Captain Van Alstyne in January, but he hadn't been introduced as Chief Veterinarian; he just had charge of the other veterinarians.

The Third Division was the first division which came to France with Major Clifton. That was the first to come overseas and to have a division veterinarian.

A great amount of the sickness that occurred among the animals was due to the handling in the remount depot. The ordinary way they take care of the horses in the United States Army is that they pen them up like sheep, always in the mud. It is no wonder that they spread contagious diseases. That was the reason. The animals that were delivered direct to the organizations never were so badly affected.

Another thing that ought to be explained is the rail transportation. You will remember they often criticized our lack of use of the railroads in evacuating animals, compared to the British service. You will remember that in the British sectors they had absolute control of the country. They owned their railroads. They had built them. We showed and argued with the staff that these cars coming up by the dozens every day with ammunition and food might just as well be loaded up with horses. But the French had those requisitioned already to go somewhere else. That was what they argued, and they said, "You can't send them out of our reach. We have planned for those." It was not easy to secure a liaison with the French railroad to get these cars up to the front as numerous as we wanted them, and for a long time that operated against us.

I want to pay my compliments to that famous G. O. 39—General Order 39—that was dated in August, 1917. It was a blow under the belt. It was illegal. They had no more right to take the Veterinary Service from the Medical Department than they had to put the dentists in the grave diggers' department or somewhere else. Congress, in their deliberations, had placed it there, and the very men who took it out knew it. It was like the preacher's son, who never took a drink; when he gets a taste he takes too much. These people couldn't play with the Veterinary Corps at home, but when they got out they did as they pleased.

I say here that the writing of G. O. 39 was a deliberate illegal act and never should have been tolerated. Major Klein and Major Mason had no right to come home when the first gun was fired. They should have stayed to help us and not simply run home because one officer in the staff said, "We are not going to do that; you are wasting your time." I would have told them, "I am going to stick around until you do listen to me."

I want to pay tribute and pay a word of compliment in behalf of all of the officers of the A. E. F. that I met. I have heard no complaint from any of them, and they all did the best they could.

Adjourned.

(Proceedings to be continued.)

OTHER ASSOCIATIONS

OHIO PREPARES TO ENTERTAIN A. V. M. A. AT COLUMBUS AUGUST 23-27

FOLLOWING the annual meeting of the Ohio State Veterinary Medical Association meeting in Columbus, January 15 and 16, President O. V. Brumley appointed a Committee on Arrangements which, with the Executive Committee of the State Association, is now busily engaged working out the details for what we hope will prove the largest gathering of the A. V. M. A. in history.

The personnel of this joint Committee on Arrangements is: F. E. Anderson, Findlay; W. A. Axby, Harrison; R. I. Bernath, Wauseon; O. V. Brumley, Columbus; Theo A. Burnett, Columbus; C. H. Case, Akron; S. R. Craver, Youngstown; D. C. Hyde, Columbus; Harry T. Moss, Dayton; W. B. Washburn, Tiffin, and F. A. Lambert, Columbus, Chairman.

At a meeting held in the office of the State Veterinarian on January 24, the various sub-committees were chosen and their work outlined. They are:

Committee on Finance and Appropriations—

- C. H. Case, 50 East Buchtel Avenue, Akron, Chairman.
- F. E. Anderson, Findlay.
- R. I. Bernath, Wauseon.
- D. C. Hyde, Columbus, Treasurer.
- D. M. Swinehart, Columbus.

Committee on Entertainment (Social)—

- T. A. Burnett, Chairman.
- B. E. Edgington, Reynoldsburg.
- D. J. Frame, Columbus.
- R. E. Rebrassier, Columbus.
- D. S. White, Columbus.
- Mrs. T. A. Burnett, Chairman (entertainment of ladies).
- Mrs. O. V. Brumley.
- Mrs. B. E. Edgington.
- Mrs. D. J. Frame.
- Mrs. R. E. Rebrassier.
- Mrs. D. S. White.
- Mrs. W. R. Hobbs.
- Mrs. W. A. Brown.
- Mrs. F. A. Lambert.

Committee on Hotels, Convention Hall and Publicity—

- F. A. Lambert, 1996 Summit Street, Columbus, Chairman.
- W. A. Axby, Harrison.
- S. R. Craver, Youngstown.
- E. P. Maxwell, Columbus.
- L. H. Smith, Columbus.

Committee on Program and Clinic—

- O. V. Brumley, Ohio State University, Columbus, Chairman.
- W. B. Washburn, Tiffin.
- J. H. Snook, Columbus.
- J. N. Shoemaker, Columbus.
- W. R. Hobbs, Columbus.
- J. D. Grossman, Columbus.

Committee on Information, Registration, Transportation, etc.—

- H. T. Moss, 710 West Third Street, Dayton, Chairman.
- Harry Worcester, Middletown.
- Reuben Hilty, Toledo.
- W. E. Clemens, Granville.
- W. A. Brown, Columbus.
- H. W. Miller, Columbus.

From the above it will be seen that the Ohio veterinarians have not underestimated their task of entertaining the A. V. M. A. and are starting early, that everything may measure up to the expectations. Ohio has been asking for the meeting for the past five years and we hope to leave no regret in the minds of those who voted for the 1920 meeting to come to Columbus. The various committees are now perfecting the details of their work. No detailed announcements are ready at this time. Numerous requests have already been received for reservations in the commercial exhibit section. Nothing more definite than that the exhibits will be held in Memorial Hall, East Broad Street, the place of the meeting, can be stated at this time. Until floor plans for the exhibitors' booths are completed no space can be assigned. Announcements will go forth to every known commercial house dealing with the profession as soon as the Committee on Convention Hall has the plans accepted.

The Deshler Hotel has been selected as headquarters and the meetings will be held in the Franklin County Soldiers and Sailors' Memorial Hall. In subsequent issues we will make announcements giving information on hotel reservations, rates, etc.

Communications relative to the arrangements may be addressed to President O. V. Brumley or Chairman F. A. Lambert.



Where the Fifty-Seventh Annual Meeting of the A. V. M. A. will be held Aug. 23-27, 1920. Seating capacity eight thousand.

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS

THE Second Annual Convention of the National Association of Bureau of Animal Industry Veterinarians was held in conjunction with the Fifty-sixth Annual Session of the American Veterinary Medical Association in the city of New Orleans, La., November 17-20, 1919.

The meeting was a thrilling one, from the first session held in the magnificent Gold Room of the Grunewald Hotel, until the final session held on the hurricane deck of the steamer *Sidney* amidst balmy breezes and the enchanting syncopated strains of the jazz orchestra. Every delegate present showed evidence that he attended the meeting for the purpose of contributing to its success and for the purpose of carrying out the policies of the Association, which are dedicated to the building up of the organization and the efficiency of the personnel of the Bureau.

Among the subjects that were discussed in a very able way are the following:

Reclassification of Federal Employees.
The Retirement of Superannuated Officials.
Overtime for Employees of the Bureau.
Death Benefits.

The convention went on record as approving the so-called Macey schedule of salaries for veterinary inspectors and lay inspectors.

It was interesting to most of the members to learn by the Treasurer's report that there was a balance in the treasury at the time of the meeting of \$3,517. A statement from the Secretary showed the total membership in the National Association as 1,009 veterinarians out of a total of 1,519. The following table gives the total number of Bureau veterinarians in the Bureau service by zones; also, the number of members of the Association in the respective zones:

	<i>No. B. A. I. Vets. in Zone</i>	<i>Number of Members</i>	<i>Number of Non-Members</i>
Eastern Zone	392	250	142
Central Zone	396	256	140
Southern Zone	391	253	138
Western Zone	340	250	90
Total.....	1,519	1,009	510

The following named were elected as officers and members of committees for the ensuing year:

National Officers

President, Dr. N. L. Townsend, New York City.
Vice-President-at-Large, Dr. Henry M. Graefe, Topeka, Kan.
Vice-President, Eastern Zone, Dr. C. S. Rockwell, Philadelphia, Pa.
Vice-President, Central Zone, Dr. M. Guillaume, Chicago, Ill.
Vice-President, Southern Zone, Dr. J. S. Grove, Oklahoma, Okla.
Vice-President, Western Zone, Dr. Gustave Kay, Omaha, Nebr.
Treasurer, Dr. L. Enos Day, Chicago, Ill.
Secretary, Dr. S. J. Walkley, Milwaukee, Wis.

Executive Committee

President, Dr. N. L. Townsend, New York City.
Vice-President-at-Large, Dr. Henry M. Graefe, Topeka, Kan.
Vice-President, Eastern Zone, Dr. C. S. Rockwell, Philadelphia, Pa.
Vice-President, Central Zone, Dr. M. Guillaume, Chicago, Ill.
Vice-President, Southern Zone, Dr. J. S. Grove, Oklahoma, Okla.
Vice-President, Western Zone, Dr. Gustave Kay, Omaha, Nebr.
Secretary, Dr. S. J. Walkley, Milwaukee, Wis.

Committee on Legislation and Publicity

Dr. J. A. Kiernan, Washington, D. C., chairman.

Dr. Clark H. Hays, Indianapolis, Ind.

Dr. James Fleming, Kansas City, Kan.

Dr. W. K. Lewis, Columbia, S. C.

Dr. Herman Busman, Omaha, Nebr.

Committee on Salary Classification Schedule

Dr. James Fleming, Kansas City, Kan., chairman.

Dr. S. O. Fladness, Washington, D. C.

Dr. J. B. Johnson, Louisville, Ky.

Committee on Constitution and By-Laws

Dr. C. S. Rockwell, Philadelphia, Pa., chairman.

Dr. Edward Horstman, Baton Rouge, La.

Dr. Howard C. Wilson, Troy, Ala.

Dr. Henry M. Graefe, Topeka, Kan.

Dr. Joe H. Bux, Little Rock, Ark.

BRITISH COLUMBIA VETERINARY ASSOCIATION

THE British Columbia Veterinary Association has taken up the matter of the practice of "plugging" of cattle before the arrival of the government inspectors to apply the tuberculin test and have drawn up some amendments to the Provincial Contagious Disease Animals Act embodying the following features:

1. Sale of tuberculin by druggists to be confined to veterinary surgeons only, name and address and amount purchased to be taken down at time of sale.

2. No person other than a veterinary surgeon, licensed in British Columbia, shall inject cattle with tuberculin.

3. Every veterinary surgeon injecting cattle with tuberculin shall report to the nearest government inspector within 48 hours after the completion of the test, the description of the animal, the name of the owner, and the result of the test.

4. Penalty for breach of above, fine of \$500.

Lastly, when the above amendments become law, to petition the Hon. Dr. S. F. Tolmie, Dominion Minister of Agriculture, to take steps to prohibit the importation of tuberculin into British Columbia, except under license from the Department of Agriculture.

The above resolution was submitted to the executive of the British Columbia Dairyman's Association by a committee consisting of Drs. Brooks, Howell, Jagger and Chester, with a suggestion that they bring the matter up at their annual convention in January

and a request that they endorse them, when they would be then forwarded to the Provincial Government.

The amendments were passed by the resolution committee of the B. C. Dairyman's Association and were debated in open convention, the president calling upon Dr. T. H. Jagger to explain the necessity for same. The motion to endorse the resolution was put and carried, and the secretary has so forwarded them to the Provincial Government and is in receipt of a letter from Dr. D. Warnock, Deputy Minister of Agriculture, that the amendments are being drafted by his legal department and he will forward to the B. C. Veterinary Association a copy when completed, and we expect they will be made law at the present session.

The British Columbia Veterinary Association at their meeting on January 17, 1920, received a communication from one of its members, Dr. C. E. Edgett, late director Canadian Army Veterinary Services, now practicing at Vernon, B. C., asking the Association to endorse a resolution and forward it to the Militia Council at Ottawa, that the Canadian Army Veterinary Service in Canada be placed in charge of a qualified veterinary surgeon, as it has not been so in the past. This was done and the Association is in receipt of a letter from Major General H. Burstall stating that under the reorganization of the Canadian Army Veterinary Services, now under consideration, it is intended to appoint an officer who is a fully qualified veterinary surgeon to administer these services.

KENNETH CHESTER,
Secretary-Treasurer.

MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION

AT the recent meeting of the Minnesota State Veterinary Medical Association a committee was appointed to meet with the county agents. This committee met with the county agents and drew up the following report, which was adopted.

C. P. FITCH, *Secretary.*

CONTROL OF ANIMAL DISEASES

Policy

Cooperate to the fullest extent with the local qualified practitioner of veterinary medicine and the State Live Stock Sanitary Board in the diagnosis of diseases of live stock. Report immediately every

outbreak of contagious or infectious diseases to the proper authorities and lend every assistance possible looking to the control and eradication of all such diseases. It shall be the duty of the practicing veterinarian to report all outbreaks of contagious and infectious diseases of live stock to the local farm bureau office as well as to authorities as required by law.

Method in Reaching Results

Realizing that skillful technical service is necessary in the use of serums, virus and vaccines, it is recommended that county agents advise farmers to secure the services of skilled veterinarians immediately in administering the above, and report the outbreak to the proper authorities, and assist them in the establishment of proper quarantine in order to prevent the spreading of the infection.

It shall also be the duty of the agents to cooperate with the local veterinarian and county health officer in advising and assisting the owner in carrying out a rigid practical quarantine and in the cleaning and rendering the enclosures and stables sanitary and in the proper disinfection of the same before the release of quarantine.

It is recommended that county agents and veterinarians make every effort possible to secure the tuberculin testing of all purebred cattle offered for breeding and dairy purposes at breeders' sales and all dispersal and private sales, and to educate the public that the law of the State requires such test before delivery of such animals.

It is suggested that both veterinarians and county agents have the same instructions for general farm disinfection.

Committee

County Agents—F. L. French, Redwood County; J. J. McCann, Pennington County; P. A. Johnson, Martin County.

Practicing Veterinarians—A. F. Lees, Red Wing; M. R. Higbee, Albert Lea; A. E. Hoffman, Detroit.

Live Stock Sanitary Board—C. E. Cotton.

Chief Veterinary Division—C. P. Fitch.

Assistant County Agent Leader—J. S. Jones.

COLORADO VETERINARY MEDICAL ASSOCIATION

THE Seventeenth Annual Meeting of the Colorado Veterinary Medical Association was held on January 22 with a rather large proportion of the membership present. Although the legislature of Colorado does not meet until January, 1921, the subject of legislation was discussed before the meeting with a view to having all necessary preliminary work done before the next session.

The bill for cooperating with the U. S. Government on the accredited herd plan in eliminating tuberculosis was approved and

the legislative committee asked to lend its assistance in passing the bill.

The bill providing for the establishment of county veterinarians where the population was thin and where some subsidy was needed for the location of a practitioner, was approved.

Dr. Spaulding, of Utah, informed us that it had been his experience that the testing of cattle under the accredited herd plan did not remove work from the local practitioner, but actually increased his efforts in this direction, since it stimulated much tuberculin testing outside of accredited herds that would not otherwise have been done.

The committee which had been appointed to determine the possibility of a uniform price for the administration of biological preparations reported that it was their opinion that a uniform price was not feasible owing to the great differences in cases and also in practices in different localities.

Four new members—Drs. J. M. Twitchell, of Center; G. W. Cooper, of Roggen; Bruce Baker, of Meeker, and J. R. Grigsby, of Wray—were elected.

A committee was appointed to collect data with a view to extending an invitation to the American Veterinary Medical Association to meet in Colorado in 1921.

Much discussion was given to the project of a short course for practitioners to be held at the Colorado Agricultural College some time in June. It was finally left to a committee consisting of the veterinary faculty of the college, with instructions to the secretary to send out a questionnaire for the purpose of determining how many members might be expected to attend.

The matter of raising money for prosecuting illegal practitioners was left to the officers of the association, with instructions to levy an assessment if found feasible.

The following officers were elected for the following year: Drs. A. N. Carroll, president; J. F. Meinzer, first vice-president; W. H. Feldman, second vice-president, and I. E. Newsom, secretary-treasurer. Executive Board, Drs. A. B. McCapes, T. H. Brady and E. E. Tobin.

Dr. G. M. Potter, extension veterinarian at the Agricultural College of Kansas, read a paper on "The Relation of the Veterinarian to Agricultural Extension," in which he discussed in a very reasonable manner this rather delicate question. The chief point of his paper was that agricultural extension had come to stay, and that

cooperation between the veterinarians and county agents was the proper solution of the whole problem. This cooperation he maintained might be an individual matter between the veterinarian and county agent in any particular locality or a declaration of principles might be arranged between veterinary organizations and extension directors outlining the scope of the county agent's activities. Following the paper, a committee was appointed, consisting of Drs. Kingman, Fisk and Morgan, to take up the matter with the extension service at the Colorado Agricultural College with a view to maintaining the excellent relations which already exist between these two activities in this State.

The matter of an accredited herd plan and tuberculin testing under it was discussed by Dr. W. E. Howe.

Dr. H. E. Kingman read a paper on "Immunization of Hogs at the Denver Stockyards," in which he discussed the regulations now in effect and their influence on the spread of the disease and on the veterinarians outside of Denver.

The horse disease, otherwise known as forage poisoning and cerebro-spinal meningitis, which caused the loss of some 2,500 horses in the State last summer, was given most attention at the meeting in papers by Drs. G. W. Stiles, O. B. Morgan and J. D. Paxton, and in discussion by nearly every member present. The consensus of opinion was that while no cause of the disease had been firmly established, yet early treatment did seem to be effective in a considerable proportion of cases.

I. E. NEWSOM, *Secretary*.

MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION

THE Fourteenth Annual Meeting of the Mississippi State Veterinary Medical Association convened in the Rotary Room of the Edwards Hotel, Jackson, Miss., February 10 and 11, 1920. There were in attendance during the session 83 members and friends.

The meeting was called to order by the president, Dr. E. S. Norton, at 9:30 a. m. The president introduced Governor Lee M. Russell, who made a splendid address of welcome. After speaking at length, Governor Russell closed by paying high tribute to the ability of the local practicing veterinarians working cooperatively with the veterinarians of the State and Federal forces in the control of animal diseases.

Dr. C. A. Cary, President of the A. V. M. A. and State Veterinarian of Alabama, was then introduced and made response to the address of welcome in a most appropriate manner. Dr. Cary in the course of his address showed clearly the economic necessity of the veterinarian in the control of animal diseases.

During the meeting addresses were delivered by the following veterinarians:

Dr. E. B. Green, Hattiesburg, Miss., "Experiences of a Veterinarian in the Late War." This subject was discussed by Dr. E. B. Jordan, West Point, Miss.

Dr. T. A. Sigler, Professor of Parasitology, Indianapolis Veterinary College, Indianapolis, Ind., "Intestinal Parasitic Diseases of Cattle and Hogs."

Dr. W. N. Cochran, Indianapolis, Ind., "Some Factors Which Determine the Potency of Bacterins in the Treatment of Acute Diseases."

Dr. W. J. Luster, Clarksdale, Miss., "Shipping Fever."

Dr. J. J. Jones, Jackson, Miss., "Cooperative Tuberculosis Eradication Work."

Dr. Tom Eagle, Oklahoma, Okla., "Hog Cholera and Its Control."

Dr. J. T. Alston, Tupelo, Miss., "Hemorrhagic Septicemia of Swine."

Dr. G. B. Bradshaw, Mobile, Ala., "Uncinariasis in Calves."

Unusual interest was manifested in the subjects discussed. Dr. E. B. Jordan, in discussing tuberculosis work, stated that if there were no fish in the pond the best angler in the world could not get a bite, but if the pond was filled with fish, the poorest fisherman in the country could catch all he needed. He continued that before cooperative tuberculosis work was taken up in his county, Clay, there was very little testing, but now he stated the people are anxious to have it done.

Dr. Henry Boswell, superintendent of the State Tuberculosis Sanatorium, gave a glowing description of the work of his institution, and stated that it was necessary to control tuberculosis among cattle before the disease could be suppressed in the human family.

On the night of February 10 a sumptuous banquet was served at the Edwards Hotel to eighty members and their friends. Several members of the State Legislature were present and responded becomingly to various toasts.

At noon the second day of the meeting the members were guests of Messrs. Enochs & Wortman, at their Hereford farm, near Jackson,

where a splendid lunch was served, after which a weight-guessing contest was engaged in, prizes being offered for the best guessers on the correct weights of Dolly Rupert and Jolly Donald, prize-winning cow and bull. While at the farm Dr. T. A. Sigler operated upon several valuable cows for sterility, and with the assistance of others removed a tumor from the eyelid of a cow.

During the meeting a resolution was adopted requesting the several Members of Congress from this State to support such measures as will rank veterinary officers in the United States Army from first lieutenant up to and including colonel and which would otherwise conform to the recommendations of the Surgeon General of the Army with reference to this matter.

The following officers were elected for the ensuing year: President, Dr. J. T. Alston, Tupelo; vice-president, Dr. W. P. Ferguson, Grenada; secretary-treasurer, Dr. J. A. Barger, Jackson.

The next meeting of the association will be held at Canton, Miss., during the latter part of January or the first of February, 1921.

J. A. BARGER, *Secretary-Treasurer.*

CENTRAL CANADA VETERINARY ASSOCIATION

THE Seventeenth Annual Meeting of the Central Canada Veterinary Association was held on January 14 last, in the Council Chamber, City Hall, Ottawa.

The meeting consisted of morning, afternoon and evening sessions, together with the usual dinner.

Unfortunately, the attendance was not up to the average, many factors, such as the interprovincial vaccination requirements, being responsible for the absence of many members. Nevertheless, the association is growing, as is evidenced by the fact that four new members were initiated into the good graces of the society.

The morning session was taken up with registration and a few items of business, mostly dealing with legislation.

The afternoon session was taken up with all unfinished business, such as the reading of the minutes and legislative discussion, the latter being principally dealt with by Dr. C. D. McGilvray, dean of the Ontario Veterinary College, and Dr. W. J. R. Fowler, Toronto, Ont. The following papers were also presented and discussed:

"Ensilage Intoxication of Cattle," by Dr. A. W. Harris, Ottawa, Ont.

"Practical Meat Inspection," by Dr. F. H. S. Lowrey, Ottawa, Ont.

"Parasitic Skin Diseases of Army Horses," by Lieut.-Col. T. C. Evans, Ottawa, Ont.

Among those at the afternoon session were Dr. J. G. Rutherford, C. M. G., Railway Commissioner for Canada, and Dr. F. Torrance, Veterinary Director General.

The meeting adjourned at 6:30 p. m. for dinner, which was held in the dining-hall of the Daly Company, Ltd. About forty-five members and guests were in attendance, the latter including Dr. J. A. Amyot, Deputy Minister of Public Health; Dr. J. H. Grisdale, Deputy Minister of Agriculture; Dr. C. D. McGilvray, principal of the Ontario Veterinary College; Dr. T. A. Lomer, medical health officer, Ottawa; Rev. J. C. Lindsay, Ottawa; H. S. Arkell, Live Stock Commissioner for Canada; Dr. W. J. R. Fowler, Toronto, and others.

A well-balanced program contributed to the success of the social entertainment. Habitant recitations by Mr. J. Cooke, Scotch songs by Mr. T. Hamilton, Irish melodies by Mr. Baker, and instrumental selections by Mr. Tattersall were greatly enjoyed.

The remainder of the evening was taken up with a discussion of the following subjects:

"Intestinal Parasites of Domestic Animals," by Dr. S. Hadwen, Biological Laboratory, Ottawa.

"Contagious Abortion of Cattle," by Dr. C. M. Higginson, Hawkesbury, Ont.

This latter subject, which is of universal interest, provoked a lengthy discussion which brought forth many helpful suggestions for combating the affection.

Altogether, the meeting was a thoroughly enjoyable one, and expressions of commendation were heard on all sides for the untiring efforts of the executive members in establishing another memorable milestone in the history of the Central Canada Veterinary Association.

The executive members for the current year are as follows:

Honorable President, Dr. F. Torrance, Veterinary Director General, Ottawa; President, Dr. George Hilton, Ottawa; Vice-President, Dr. J. M. Bordeau, Embrun, Ont.; Secretary-Treasurer, Dr. A. B. Wickware, Ottawa, Ont. Council—Drs. Hollingsworth, Hall, Barnes, Marriott, Sparks, Ottawa; McGuire, Cornwall, Ont.; Metcalfe, Vankleek Hill, Ont. Auditors—Drs. Hadwen and Kennedy.

W. B. WICKWARE, *Secretary*.

PRINCE EDWARD ISLAND VETERINARY MEDICAL ASSOCIATION

MEMBERS of the veterinary profession of this Province met in Charlottetown on Tuesday, January 13, 1920, for the purpose of discussing the advisability of establishing a protective and educational association.

Dr. W. H. Pethick, the dean of the profession in this Province, was unanimously selected as Chairman, and Dr. K. W. McKinnon as Secretary of the meeting.

The Chairman called upon Dr. J. A. Allen to open the discussion. Dr. Allen briefly traced the history of the profession's fight for legislation in other Canadian Provinces, and remarked that it was regrettable that Prince Edward Island was the only Province following the lethargic example of Ontario, the result being that men were from time to time added to the ranks of unqualified practitioners. Fortunately, however, the problem of quackery in Prince Edward Island is not as discouraging as that of Ontario, and if the proper steps are taken it is his belief that legislation could be obtained at the coming session of the Provincial Parliament.

Dr. Allen also gave a brief outline of the methods to be adopted in seeking legislation. It was manifestly impossible to secure protection because of the antagonism of rural members of Parliament and the empiric practitioners, unless some plan could be devised to register or license the unqualified men who were already dependent upon the treatment of disease for a livelihood. The speaker further stated that the first essential was to form an association, and in order to get the movement launched and put in concrete form a motion was adopted that an association to be known as the Prince Edward Island Veterinary Medical Association be immediately organized.

Dr. Pethick was unanimously chosen for the presidency. He at first declined, but eventually yielded to the sincere opinion of the meeting that it was most fitting that the dean of the profession in this Province should be selected for the honor. The other officers appointed were: Vice-President, Dr. A. A. Leckie; Secretary-Treasurer, Dr. K. W. McKinnon.

The first formal meeting of the Association was then opened for business. The problems of veterinary legislation and the status of the unqualified practitioners were thoroughly discussed by Drs. Croken, Bousfield, Bright, McKinnon and Derome, and it was unanimously carried that the executive be appointed a committee to in-

interview the representative lay practitioners with the view of determining their attitude and the terms upon which a cooperative effort could be made for the desired protective legislation. It was further decided that before the executive consummated any agreement between the profession and lay practitioners a combined meeting be held in Charlottetown, at which the whole matter would be discussed and the terms of the agreement formally ratified.

On the motion of Drs. Bousfield and Croken, it was decided that the executive be empowered to consult the executive of the associations of the medical, dental and pharmaceutical professions for the purpose of obtaining the cooperation and moral support of the members of these professions in our efforts to obtain governmental recognition.

All members attending the meeting, with Dr. Allen as Chairman, were appointed a committee to draft by-laws to govern the deliberations of the Association.

Upon the suggestion of Dr. Pethick, the Secretary was instructed to communicate with the authorities of the various Provinces and obtain copies of the acts controlling veterinary practice in these Provinces.

Letters of regret for inability to attend and promising ardent support of the movement were received from Drs. W. G. Church and F. S. McDonald.

In closing the meeting Dr. Pethick thanked the members for the honor of the appointment and promised his faithful service in furthering the interest of the profession. Dr. McKinnon also promised to work ardently for the cause and to support the President in all his activities.

K. W. MCKINNON, *Secretary*.

RHODE ISLAND VETERINARY MEDICAL ASSOCIATION

THE Rhode Island Veterinary Medical Association held its annual meeting at the Hotel Dorrance, Providence, R. I., in January. An interesting series of papers were presented and fully discussed, after which the election of officers for the ensuing year was taken up, resulting as follows:

President, Dr. J. M. Armstrong; First Vice-President, Dr. J. S. Pollard; Second Vice-President, Dr. C. T. Frey; Secretary, Dr. G. L. Salisbury; Treasurer, Dr. T. E. Robinson; Finance Committee, Drs. Pollard and Frey; Legislative Committee, Dr. C. T. Frey, Dr. T. E. Robinson, Dr. G. L. Salisbury, Jr.; Committee on Diseases,

Dr. J. D. Jones, Dr. C. Horseman; members of the Executive Committee, in addition to the board of officers, Dr. J. M. Heard, of Newport, Dr. E. J. Cole, of Pawtucket.

Matters of interest relative to the animal health of the State were brought before the meeting and ably discussed. We will hold the mid-summer meeting the second Tuesday in June.

G. L. SALISBURY, JR., *Secretary*.

ALLEGHENY VETERINARY CLUB

THE February meeting of this club was marked by an interesting address on "The Diseases of the Rumen in Bovines" by Dean Louis A. Klein of the University of Pennsylvania. During the free discussion which followed Drs. Shenk and James A. Waugh described derangements of digestive organs observed recently in cows in advanced pregnancy shipped from Wisconsin. Dr. Waugh explained the dearth of literature on this subject and suggested that someone should write an article on this condition for the JOURNAL.

JAMES A. WAUGH.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The Connecticut Veterinary Medical Association held its annual meeting in Hartford at the Hotel Garde on February 3, when the following officers were elected:

President, Dr. A. W. Sutherland, Bristol; first Vice-President, Dr. J. L. Devereaux, Waterbury; second Vice-President, Dr. G. L. Cheney, New Haven; Secretary, Dr. George E. Corwin, Hartford; Treasurer, Dr. Thomas Bland, Waterbury.

Twenty-five members of the Association were present and heard the report of the American Veterinary Medical Association's meeting at New Orleans, given by Mr. James M. Whittlesey, Commissioner on Domestic Animals.

It was voted to hold the next quarterly meeting in Waterbury on May 4.

GEO. E. CORWIN, *Secretary*.

MAINE VETERINARY MEDICAL ASSOCIATION

THE twenty-seventh annual meeting of the Maine Veterinary Medical Association was held at the Augusta House, Augusta, Me., January 14, 1920, with 26 veterinarians present.

Officers elected for the ensuing year were: President, Dr. W. H. Lynch; Vice-President, Dr. C. F. Davis; Secretary, Dr. P. R. Baird.

The following papers were presented and fully discussed: Anthrax, by Dr. M. E. Maddocks of Augusta, Me.; cystic ovaries, by Dr. H. B. Wescott of Portland, Me.; glanders, by Dr. A. J. Neal of Dover, Me.; sterility, by Dr. P. R. Baird of Waterville, Me.

The Association voted to contribute \$50 to the Salmon Memorial Fund.

It is very gratifying to the members of the Maine Association to have one of its members again occupying the office of State Live Stock Sanitary Commissioner. Dr. W. H. Lynch of Portland, Me., began his duties January 1st.

The next meeting will be held at the State House, Augusta, Me., in April.

P. R. BAIRD, *Secretary and Treasurer.*

CATTLE-FEVER TICKS AND METHODS OF ERADICATION. By W. P. Ellenberger and Robert M. Chapin. *Farmers' Bulletin* 1057, U. S. Dept. of Agriculture. Pp. 32, figs. 5. Free.

STOCK-POISONING PLANTS OF THE RANGE. By C. Dwight Marsh. *Bulletin* 575, U. S. Dept. of Agriculture. Reprint with slight revision, 1919. Pp. 25, pl. 30. For sale by Supt. of Documents, Government Printing Office, Washington, D. C. 50 cents.

A concise description of the more important poisonous plants of the range country, illustrated with 16 plates in colors and 14 in half-tone.

TUBERCULOSIS IN LIVE STOCK. DETECTION, CONTROL AND ERADICATION. By J. A. Kiernan and A. E. Wight. *Farmers' Bulletin* 1069, U. S. Dept. of Agriculture. Pp. 31, figs. 21. Free.

STATE SANITARY REQUIREMENTS GOVERNING ADMISSION OF LIVE STOCK. Compiled from reports of accredited officials of each State. Bureau of Animal Industry, U. S. Dept. of Agriculture. Pp. 67.

This is a concise compilation based on the laws and regulations of the various States. It contains information useful to official veterinarians and others concerned in the inspection of live stock for interstate movement.

MISCELLANEOUS

COMPLAINTS FROM MEMBERS

DURING the past six or eight months the Secretary has received a large number of complaints from members who have not received their copies of the JOURNAL regularly. In every case the matter has been taken up and referred to the Editor of the JOURNAL. The member has also been notified.

During the past two years a large number of members, particularly those who have been in the Army Service have changed their addresses frequently, and this probably accounts for some of the failures to receive the JOURNAL. It must also be remembered that following the New Orleans meeting it was necessary to move the JOURNAL office and all of the equipment to Washington, and this has seriously hampered the new Editor in getting the mailing list of the JOURNAL straightened out. Some of the boxes, I am informed, were broken in transit and both cards and stencils became sadly mixed and confused. Since January, over 1200 changes of address have been made by the Editor, so the mailing list at this rate will soon be in good shape.

In all cases where the Secretary receives a notice of a change of address of a member, the changes are made on the books in the Secretary's office and a notice also sent to the Editor of the JOURNAL. Carbon copies of such notices have been kept.

It is important that members should keep the Secretary or the Editor advised correctly as to their change of address. If you are not receiving the JOURNAL, notify the Editor, and he will give it prompt attention. The writer knows that the new Editor has had a tremendous task on his hands, but he is also making a strenuous effort to get the mailing list straightened out and to keep it revised up to date.

N. S. MAYO,

Secretary.

STOCK REMEDIES, TONICS AND NOSTRUMS

FARMERS who lose money by the indiscriminate purchase of stock remedies, tonics and nostrums would do well to get the advice of a reputable veterinarian for diagnosis prior to such purchase, suggests Prof. B. A. Dunbar, head chemist of the South Dakota Experiment Station.

Professor Dunbar reports that analyses of the flood of tonics and stock foods that have come to the chemistry department show the main ingredients to be about as follows:

"They usually carry a large percentage of common salt; a laxative such as Epsom salts, Glauber's salts, and the like; sulphur; charcoal or other form of carbon; sulphate of iron as a tonic vermifuge, and usually a filler by way of mill feeds, oil meal, screenings, grass seeds, peanut shells, sand or tankage. We usually find a very small quantity of a mild drug like gentian, fenugreek, ginger or pepper.

In the light of these findings, it would seem that if the farmer lacks access to a regular veterinarian he might well buy such drugs locally and serve them to his stock in small doses, thereby having the satisfaction of knowing just what he is feeding, as well as knowing that the real food value of his ration is in the form of feed grown upon his land and of a known quality.

It is but fair to add, however, that the extra care given to animals under treatment has produced its good results, because we usually heed advice that we pay a high price for. Almost invariably the directions accompanying the sale of patent stock remedies and foods demand unusual attention to the sanitary and feeding conditions which must be observed during treatment. I doubt not that this feature of extra care and control of animals alone has contributed much to the health of the stock. Whatever we may say of the value—or the lack of it—of these remedies, we must admit that this unusual care will have its good effect.

Several of our experiment stations have tried out stock feeds in actual practice, and under the best possible conditions of sanitation and surroundings but two of twenty or more trials showed that there was any material improvement to be gained from the use of the feeds, and these results are open to question.

In so far as these materials may lay claim to a large value as extra nutrients, we cannot admit them to our confidence, since whatever constituents they may carry are present in such small amounts as to make this claim inconsiderable. Again, such doses of condimental materials or medicinal drugs as are found in the ordinary rations of these materials are so slight as to have little marked effect along the line suggested by the presence of the drug. In administering the same medicines, a veterinarian would not recognize the quantities as found in these remedies as at all sufficient."

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THE VETERINARIAN AND CIVIL SERVICE

AFTER a year of strenuous labor the Joint Congressional Commission on the Reclassification of Salaries recently submitted to Congress its findings, which involves all of the 107,000 Government employes in the District of Columbia. While this report is like a ray of sunshine breaking through the clouds to the large majority of employes whom it affects, it is considered as a "blow below the belt" to the lay and veterinary inspectors of the Bureau of Animal Industry located in Washington. Although it is probable that the classification given to these two classes, especially to the veterinarian, was due to an inadvertence caused by a misunderstanding of the services rendered, it is nevertheless a fact that the latter position is not classified with that of any other scientific or technical employment in the Government service. Every other position that could be in any way considered on an equal basis is uniformly classified and the entrance salary for the junior grade is similar in every instance, namely, \$1,800, whereas the entrance salary of the junior veterinarian is \$1,380. In the other classifications of technical workers provision is made for promotions from the junior grade to higher grades by increments of \$120 per annum for three

years, but the veterinarian who begins his service at \$420 per annum below that of the junior grade of any other technical class may only be promoted by annual increments of \$60. We are at a loss to understand how a commission, after reviewing the qualifications of an applicant to become eligible as a veterinary student and the rigid four-year curriculum required for his veterinary degree, could come to the conclusion that the necessary training for this position is below that of any other scientific or technical worker. There are positions classified by the commission and placed in the category of scientific and technical employment at a uniform fixed entrance salary of \$1,800 that do not require the fundamental education and scientific training that the veterinarian must now receive before he is eligible to take a civil service examination for Government employment.

We are equally confused and chagrined to learn that the veterinary service is evidently considered of less importance to agriculture than any other technical or scientific service in the Department of Agriculture. This conclusion is forced upon us because every other position of a scientific or technical nature in the Department carries an entrance salary of \$1,800 per annum.

It is true that the report of the Reclassification Commission applies only to employes in the District of Columbia, but it affects the administrative officers and their assistants in carrying out the various bureau activities that are now in progress throughout the United States.

One of the benefits contemplated by Congress in appointing such a commission was the evolvement of a plan which would do justice to the employes and to the Government and make Government employment attractive, not so much on account of high salaries as the assurance of just treatment and the proper recognition of efficiency. If this plan were enacted into law and administered in good faith, the young veterinarian who entered the civil service could do so with pride and with confidence that the Government would prove a just and appreciative employer. No longer would Government service be looked upon merely as a haven or as a stepping stone to permanent and better positions outside.

Realizing that in attempting a task of such magnitude mistakes and injustices might creep in, provision is made for an appeal board for the purpose of hearing complaints regarding classifications and salaries and for remedying any defects of this nature that may be disclosed. With this opportunity afforded, the Government veteri-

narians in the District are already planning an appeal from their classification and salary gradations. It is to be hoped that this apparent injustice and discrimination against veterinarians will be speedily remedied, as the morale of the service will be so shaken that it will be difficult to re-establish it unless the discrepancies are adjusted. Within the last five months the Bureau has lost 104 veterinarians, many of whom were among its best trained men. Even under present conditions, many more would sever their connections with the Bureau if it were not for the long association they have had with it and their earnest personal interest in their respective lines of work. The ties established between officials and the particular class of work they have helped to develop are frequently worth more than money. Many of the employes who have resigned indicated their willingness to remain in the Department at considerably less compensation than they were offered outside the service, but the necessary funds to retain these men were not available.

The Congressional Commission was kind enough to permit each group of employes to appear before it and present a statement of the work performed by its personnel. The Chief of the Bureau presented a schedule for all the veterinarians in one group, with an initial salary of \$1,800 as in the Macey schedule, but unfortunately the commission saw fit to divide the veterinary service into three sub-classes, namely, veterinarian, veterinary bacteriologist, and veterinary pathologist, giving to the latter two sub-classes the initial salary recommended, but withholding it from the first sub-class. While veterinary bacteriologists and pathologists may be promoted to \$5,040 and are eligible for the position of Chief of Bureau, the other veterinarians can reach only \$3,600 and are not eligible for the ranking position.

Furthermore, the commission classified the Bureau lay inspectors, who are of great importance in the various activities of the Government, as meat inspectors, a position which was abolished several years ago. A range of salaries was specified between \$1,380 and \$1,620. While an entrance salary of \$1,380 might be considered satisfactory, the nature of the duties performed by these lay inspectors warrants the maximum salary being placed much higher than \$1,620.

This position should be graded as junior lay inspector, lay inspector and senior lay inspector, carrying salaries ranging from \$1,380 to a maximum of \$2,400 through the various grades—as the

commission has provided in the case of inspectors of city refuse. It should be apparent to anyone that the work of inspecting the meat food supply of the country is of far more importance than the supervision of garbage collection.

Veterinarians cannot remain satisfied with public service when they are thus discriminated against in the case of both rank and salary, and it is inconceivable how the Federal Bureau can be maintained and recruited so as to function properly when it is possible for young men to enter into any other line of scientific or technical Government work at compensations and with recognition far superior to those afforded under the proposed reclassification. And in view of the present high requirements for entering veterinary colleges and the low rating of veterinarians, it could not be expected that many young men confronted with these conditions would be attracted to the study of veterinary medicine with the intention of entering the public service.

While this reclassification will affect only the men who are in the civil service, it must be apparent that their standing as well as the standing of our colleagues in the Army is a matter of grave importance, involving as it does the recognition of the profession in general. In addition, it would eventually affect seriously the livestock industry of the nation, as there would immediately follow a marked decrease in the number of veterinary graduates. As indicated below, the attendance at veterinary colleges has already been markedly on the wane since 1915, due partly to war conditions, increased entrance requirements and other factors.

<i>Session</i>	<i>Number of Freshmen</i>	<i>Total Attendance</i>	<i>Number of Colleges</i>
1915-16.....	1,233	2,992	21
1916-17.....	637	2,661	21
1917-18.....	338	1,841	21
1918-19.....	264	1,114	17
1919-20.....	372	1,287	17

These numbers are exclusive of 30 veterinary students at accredited agricultural colleges in 1918-1919, and 40 such students in 1919-1920.

With the discrimination and lack of appreciation shown the profession by the Reclassification Commission, it is more than probable that a further reaction will be noted in the matriculation at veterinary colleges this fall.

The service which an organization can render is determined by

the vision and ability of its responsible employees. The Government is at present in competition with and outbid by business interests, educational institutions and State agencies. Unless provision is made for speedy relief, such a condition will impair the efficiency of all activities of the Bureau and result in its failure to render that splendid service and continue that accepted leadership which the profession in general and the live-stock interests in particular have a right to expect from it. However, we have faith in the ultimate sense of fairness of Congress and no stone will be left unturned to correct the unsatisfactory and unfair classification which obtains in the recent report of the commission.

DECENNIAL PHARMACOPOEIAL CONVENTION

THE decennial convention for the revision of the last edition of the United States Pharmacopoeia will be held in Washington, beginning May 11, 1920. This convention consists of delegates appointed in accordance with the by-laws and representing various organizations that have to do with pharmacy, medicine and allied sciences, such as the State pharmaceutical associations, the American Pharmaceutical Association, the American Medical Association, the several colleges of pharmacy, the U. S. Public Health Service, the Medical Corps of both the Army and the Navy, and the Department of Agriculture.

As one of the delegates to this convention, we invite suggestions from our readers for improving this valuable treatise, by either adding to or subtracting from the present list or by elaborating upon certain drugs which have special merit in the treatment of diseases of live stock; in fact, any suggestions that may help to make this work of more value to the veterinary profession would be welcome. Prompt action in this matter is necessary if the suggestions offered are to receive attention.

The United States Pharmacopoeia is a legal standard for all the drugs listed in it. Despite its recognition by the United States Government, it is not produced by the Government. It is prepared technically by a corporation, but actually by a convention which meets each decade to revise the previous edition of the Pharmacopoeia.

An effort is to be made to complete the work in a much shorter time than was required for the last revision.

WHITE OR CALF SCOURS¹

By W. L. WILLIAMS, W. A. HAGAN and C. M. CARPENTER, *Ithaca, N. Y.*

WHITE scours, calf scours or dysentery constitutes one of the most fertile of fields for differences of opinion. It has never been clearly defined and perhaps will not be for some time to come. It has received very scant attention at the hands of investigators. Veterinarians generally have views concerning it which are not clear and are difficult of expression. Breeders have taken almost no intelligent interest in it. They complain loudly about their losses, it is true, and ask the veterinarian concerning some home remedy or something the veterinarian can hand to them without bothering to see the calves, which the owner may give, turn his back and let the calf recover—or die. After the senior author had been in practice for about thirty years a breeder one day said, "I wish you veterinarians knew of something to do for white scours." I replied, "Perhaps we might do something if given an opportunity to try. I have not yet had a chance to try upon one calf."

White scours or calf scours is a term which is commonly applied to a severe diarrhea or dysentery occurring from a few hours to a few days after birth. Some writers limit the period to the interval between a few hours after birth to three or four days later. Diarrhea occurring at other times or of a mild type is commonly designated by a different name, but the line of demarcation is not clear and the limitation to such a period as indicated is purely arbitrary.

Diarrhea is common in the fetus. Physiologically, as soon as the alimentary tract is formed and the pharynx opens, the fetus commences to swallow but does not defecate. The amniotic fluid is constantly being swallowed along with any exfoliated epidermic scales or other solids suspended in the fluid. Before hairs are microscopically visible, meconium examined under a low-power lens reveals tiny short hairs which have been shed and then swallowed. The swallowed liquor amnii is promptly absorbed by the intestines, gains the fetal lymph or blood stream, and later presumably returns to the amniotic sac. The solids, such as hairs, bacteria and epithelial scales, remain behind in the intestinal canal as in a cesspool, to constitute the meconium. Since physiologically the fetus does not defecate, and constantly swallows its amniotic fluid, it follows that it is regularly clear while the allantoic fluid is frequently turbid.

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

But the fetus, like the born animal, does not always travel serenely upon the physiologic path. Nearly half the uteri of pregnant abattoir cows contain bacteria which have the power to, and do, penetrate the chorion, contaminate the amniotic fluid and are swallowed by the fetus. We have found, thus swallowed, colon bacilli, streptococci, staphylococci, micrococci and *Bacillus abortus*. Physiologically we think this should not be. Their presence does not necessarily cause disaster. Up to a considerable volume of bacteria the walls of the cesspool, the alimentary epithelium, perhaps aided by the biliary or other secretions and probably favored by the marked desiccation of the meconium in the rectum, holds in leash the bacteria present.

The power of the fetal intestine, like that of the adult, has its limitations. If the volume of bacteria is too great, or the virulence too high, the restraining power of the intestine may break down. Or if the fetus is weakened, owing to a disturbance of its nutrition, its control over resident infection may be lost. Thus when placentitis is present the nutrition of the fetus is crippled and harmful products, due to the infection in the placenta, reach the fetal circulation. The fetus undergoes partial suffocation. It is not strange, therefore, to observe that aborts frequently if not generally suffer from diarrhea prior to the occurrence of abortion. In examining aborts it is common to find meconic pellets in the stomach; that is, prior to death the fetus had defecated and then swallowed its own excrement.

In the later stages of pregnancy, fetal diarrhea is not rare. We have seen many gallons of diarrhetic feces in the amniotic sac at the time of the expulsion of the fetus. In other cases there is but a moderate amount of feces in the amniotic sac, the new-born calf being thickly smeared over with soft, sticky, brownish-yellow feces.

The calf which has suffered in utero from dysentery and is expelled completely covered over with excrement is sometimes vigorous. This is an interesting fact carrying with it suggestions regarding the nature and handling of dysentery to which we shall again allude. In some cases calves are born while dysentery is in active progress. We now have such a heifer calf which is growing with exceptional vigor.

Most cases of severe white scours develop within a few hours to a few days after birth, but we can fix no time limit. In our research calves we now and then see an acute dysentery after 10 to 15 days, but these have been generally, if not always, relapses after we had

first brought the dysentery under control and the calf had apparently been well for a number of days. So far as we could observe, these late cases or relapses were etiologically identical with those occurring earlier. Clinically they presented the same symptoms and reacted in the same manner to therapeutic efforts.

There is no clear line of demarcation between white scours and health. One might try to evade the question by resorting to the old step-ladder expedient of recognizing acute, subacute and chronic calf scours. It befuddles both writer and reader. At one extreme is the ideally healthy calf, at the other the calf with fatal dysentery. Neither does there exist a clear line of demarcation, contradictory as it may seem, between white scours and calf pneumonia. Clinically the two glide imperceptibly into each other and etiologically they can not now be differentiated. We desire, therefore, to handle the subject from a broad and liberal conception and to think of white scours as generally described as an intense phase of a very common and destructive infection invading the alimentary tract of fetuses and new-born young.

The etiology of calf scours has not been clearly determined. Numerous writers regard it as a specific contagious or infectious disease having one bacillus as the uniform causative agent to which is frequently added other complicating organisms. This is difficult of proof or disproof. It has already been noted that diarrhea is common in fetuses which are later to be aborted. Most investigators of abortion record only their findings regarding the *Bacillus abortus*. They state generally that they recovered the *B. abortus* from the alimentary tract of the abort, but fail to state whether other bacteria were present or not. According to our investigations the *B. abortus* is not nearly so common as some other bacteria in the utero-chorionic space, the fetal alimentary tract or the alimentary tract of the calf with or without diarrhea.

A bacillus belonging to the colon group is the dominant organism obtained by cultural methods, accompanied by staphylococci, streptococci of viridans group, and micrococci. The dominating appearance of the colon organism may be partly or largely due to its rapid growth in artificial media. So far as ascertained it is identical with the colon organism commonly resident in the non-gravid uterus of the cow. It has not been definitely separated from the colon organism in the digestive tract of adult cattle.

It is commonly asserted, without qualification, that white scours can be regularly caused by inoculation with cultures of the colon

organism. We have tried several times and in different ways and always failed. This seemed to us peculiar, especially since Jensen and others are regularly cited as having clearly proved by experiment the specific character of the bacillus. A critical study of his recorded experiments at least partly explains the apparent contradiction between his researches and ours. The researches of Jensen were faulty in several respects as viewed by our standards. (1) There was no evidence that the gastro-intestinal contents of the calves selected were free from bacteria when born. (2) Details or even a general outline of the feeding is wholly wanting. (3) Most of the controls as well as the inoculated calves had diarrhea, but it was slower in developing in the controls and less frequently fatal, but otherwise showed no differential characteristics.

Having already indicated that we regard dysentery of the new-born as of bacterial origin, we admittedly consider it transmissible. But the basic transmissibility of the infection is one thing and a ready means for the regular transmission of the violent type of the disease is another. The experimenter is also faced, as in abortion, with the impossibility of determining in advance the freedom of the experimental animal from the infection under consideration.

Cultures from the meconium are not wholly reliable. Bacteria in large numbers may exist in the gastro-intestinal canal and cultures made from the meconium remain negative. Recently we have intubed the stomach immediately after birth and in this way have obtained bacterial growths when the meconium gave negative results, but we have not found this plan faultless in determining the exact bacterial state. Cultures are often obtainable from the small intestines, when the rectal meconium is sterile, apparently because the bacteria in the latter have perished. Neither have we been able to rely upon the agglutination of the blood of the new-born calf. Bacteria within the gastro-intestinal tract is not what might in one sense be called infection. It appears rather comparable to the bacterial flora commonly resident upon the body surface. So long as the cutaneous epithelium is intact, infection does not follow, but when the epithelium is divided or destroyed, wound infection occurs. Then follow generally local and systemic reactions against the invader and a contest begins between it and the host. Hence the blood of some new-born calves agglutinates certain bacteria which exist in the uterus of the mother and the gastro-intestinal tract of the fetus, but according to our researches these constitute the exceptions and are due to the existence of an active infection. That is,

the bacteria in the fetal alimentary canal have attacked the digestive mucosa and the bacteria or products of their activity have invaded the tissues and body fluids.

As a rule such invasion has not yet occurred in calves which are vigorous when born, although in highly infected herds the gastro-intestinal tract is almost always heavily laden with bacteria. Soon after birth, even though such calves do not always break down with virulent dysentery or pneumonia, their blood frequently acquires a high agglutinating power to various bacteria. In the typically healthy calf, however, high agglutinating power to these various bacteria does not become established, so far as we know. In other words, bacteria within the gastro-intestinal tract (and perhaps also in the genital tract) may lead an uneventful existence without producing any recognizable traces of any effect upon the animal body, just as bacteria of many genera may and do exist upon the skin without peril until some injury to the epithelium occurs. Like bacteria upon the skin, those within the gastro-intestinal and genital cavities are technically outside the body and acquire importance only when they invade the tissues.

When we add to these obstacles the utter impossibility of clearly defining white scours, the difficulty of securing definite experimental data upon its etiology is apparent. Our virtual failure to experimentally cause typical and violent dysentery neither disproves nor tends to disprove its infectious character. Bacteria are present in abundance in dysentery, and when it is fatal they penetrate the alimentary mucosa and invade the various internal organs. The conclusion can not be avoided that, since in most cases of calf dysentery there is an abundance of bacteria present and that the organisms recognized are reasonably uniform in the different patients, the disease is due to infection and that the bacteria multiplying disastrously in the alimentary tract of one calf would likewise multiply, though not necessarily disastrously, when properly placed in the digestive tract of another calf. Clinically this is apparently true. White scours breaks out in a large stable and pursues the relentless course of a scourge, causing a mortality of 10 to 100 per cent for months together. It then impresses the observer as a highly infectious malady.

Therapeutic evidence also apparently indicates its infectious character, though this may be misleading. When a horse is rendered highly resistant to the dominant colon organism associated with white scours by means of repeated inoculations, his blood serum

injected into a calf with white scours generally acts specifically to ameliorate the disease. We have found no record, however, of any control experiments to show that the blood serum from a horse not immunized or fortified by means of artificial inoculation with the colon organism would not have a like effect. A more direct test perhaps is the use of killed cultures of artificially grown bacteria in the disease of calves. Limited observations seem to indicate that these act specifically under conditions not yet fully determined and give to the calf a more enduring resistance to diarrhea than the serum.

As already intimated, white or calf scours is not clearly defined and hence its symptoms can not be accurately described. There is no epoch during which the line of demarcation between health and disease is so dim and hazy as in young calves. The average calf has, when born, a glossy, brilliant coat of hair, soft and velvety to the touch; its body is of even contour and plump, and when vigorous it is up and playing in an hour or two. Its intestines, especially the rectum, contain a pound or more of rather hard yellowish or greenish to greenish-black meconium consisting of biliary salts, exfoliated debris, hairs and generally a swarm of bacteria. The size of the meconial pellets, their adhesion to each other and their degree of desiccation vary greatly and sometimes suggest that their character is largely dependent upon the quantity and nature of infection present. Dysentery may exist at birth or may develop at any hour post-natal. When a cow or heifer has very severe infection in her uterus the fetus when born is often exceedingly dull and languid. It is unable to get up or to stand when helped to its feet. Perhaps no diarrhea is present. It may, in fact, die of what appears as extreme sepsis and an autopsy shows the general lesions observed in abortions, such as sub-peritoneal or sub-pleural hemorrhages of the viscera suggestive of septicemia, apparently the calf septicemia of numerous writers. If death is held in abeyance the calf generally develops violent dysentery.

Other calves are born apparently well and proceed to break down with diarrhea in a few hours up to eight, ten or more days, but the later in life the attack the less stormy its course. When violent dysentery is impending the first indication of the coming storm is a sudden rise in temperature. At this epoch the calf is not notably ill, the feces are not thin and there is no marked loss of appetite. But this, in severe cases, is not for long. Soon in many cases there are streaks of blood in the feces if any chance to be voided. In

one to a few hours later the storm breaks and the observer frequently sees one of the most virulent and rapidly fatal diseases in animals, frequently destroying life in 10 or 12 hours. When the dysentery sets in the temperature vacillates. Often the anus is paretic and the rectum is open and flaccid so that the thermometer reveals little of the actual temperature of the body.

The feces offer the widest possible variation in character. In the fetus the diarrheic feces are usually yellowish, greenish-black or black. In post-natal dysentery the fecal discharges are much the same as in the intra-uterine diarrhea if the storm breaks before the calf has taken milk, and until the milk or its derivatives have passed through the digestive tract to modify the excrement.

After milk has been taken the character of the excrement is necessarily altered. The milk-filled stomach serves as a large flask filled with an excellent medium (milk) for the multiplication of the bacteria present, while the body heat provides ideal incubating warmth. The milk undergoes rapid bacterial decomposition and is hurried along the alimentary tract with great rapidity. The feces may contain some small decomposing milk particles still retaining some of its white color, but it has mostly disappeared. The bacteria cause the liberal formation of highly fetid gases, and these, mixed in small bubbles in the thin feces, may lend to them a whitish color. But the color varies greatly. Sometimes it is greenish, often brownish or yellow. In very severe cases the discharges are extremely thin and watery, mixed with minute particles of débris giving it a dirty brown color, and charged with bubbles of highly fetid gas which escape quickly.

One of us (Carpenter) believes that the color of the feces is largely determined by the bile. In calves dying from dysentery he finds that the gall bladder contains 50 to 200 c.c. of bile, while that of a healthy veal calf ordinarily contains from 5 to 20 c.c. The failure of the bile to be discharged perhaps plays a highly important part in both the color of the excrement and the violence of the disease.

In large stables where numerous calves are suffering from the disease in various stages the odor from the calves is highly repulsive, of a sweetish sickening character.

The general appearance of the calf changes rapidly. The watery feces are forcibly expelled for a time, but later escape involuntarily through the paretic anal sphincter. The calf loses weight and volume with enormous rapidity. It takes no food or water, while

the water of the tissues is being rapidly withdrawn to constitute the chief volume of the diarrheic discharges. The calf becomes unable to rise, lies flat on its side with its head drawn back (opisthotonus), becomes unconscious and dies.

Short of this violent type there is every gradation, and in cases of great virulence the dysentery may at any time abate and the calf rally and without definite therapeutic handling undergo more or less marked improvement and may eventually recover.

Regardless of the grade of alimentary disturbance there is a tendency toward the development of pneumonia. Sometimes the pneumonia develops suddenly and violently with all the clinical symptoms of that affection. Other cases creep on insidiously with a hacking cough associated with the digestive disturbances. The pulmonary difficulty tends to aggravate the digestive trouble by lowering still more the resisting power of the animal. In many cases the only clinical evidence of pulmonary disease is an occasional hacking cough.

The clinical evidences of pneumonia may appear at any time from a few days after birth up to 90 to 100 days old. Like the dysentery, it is more prone to pursue a stormy course when it develops early. Dysentery and pneumonia each serve to conceal and intensify the other. The high temperature of dysentery causes rapid breathing, and the dyspnea of pneumonia tends to detract attention from any dysentery present.

Arthritis is not rare, and, like the pneumonia, may be violent or may be of so low a degree as to be difficult of clinical recognition. The onset of arthritis may be extremely sudden. The calf is up and about feeding and looking well. An hour later it is so lame in one limb that it refuses to bear any weight upon the affected member. The involved joint is greatly swollen, tense, hot, and extremely painful to touch. A little later some other joint may be equally involved and, two or more limbs becoming affected, the calf is unwilling or unable to stand. In other instances the affected joints are neither greatly swollen nor very painful. Several or all limbs may be involved, causing the calf to walk slowly and cautiously without marked lameness in any one limb. As in pneumonia, so in arthritis, lesions are found upon autopsy which had not been clinically recognizable.

Other evidences of disease appear not readily assignable to a proper place in the course of the basic infection. Amongst the most common of these are ulcers and abscesses about the mouth,

nose, and especially the cheeks. These aggravate exceedingly the clinical course of the malady. The lesions are probably due to a secondary invasion for which the basic infection has prepared a vulnerable field. Rachitic enlargements of the bones are not very rare, but their relation, if any, to the basic infection is unknown.

Pyemic abscesses may rarely occur in any organ or tissue in the body and have the same significance as the arthritis. Occasionally a pyemic abscess occurs in the spinal canal with final complete paralysis of the posterior body.

The postmortem findings vary with the form and duration of the disease. In calves succumbing to violent dysentery the lesions are those of gastro-enteritis and septicemia. Hemorrhages occur in the capsule of the spleen or the outer and inner walls of the heart and elsewhere. The fourth stomach shows great reddening (congestion) of its mucosa and the folds are generally edematous. The duodenum shows similar lesions. The remainder of the alimentary tract is not so markedly altered as a rule, although the tops of the folds of the rectum are frequently highly congested and sometimes hemorrhagic. When the immediate cause of death has been pneumonia, the principal lesions are, of course, found in the lungs. In most cases the anterior lobes alone are affected, but in some cases even the diaphragmatic lobe is largely solidified. The pneumonic area is rather whitish or grayish white, is mottled and has a feel much like that of normal pancreas. There is seldom any pleuritis. When viewed under the microscope the affected area is seen to be filled with enormous numbers of polymorphonuclear leucocytes. It is these which give to the diseased lung its grayish, mottled appearance. The condition is a severe purulent broncho-pneumonia. The synovial membranes of the chief joints like the femoro-tibial, the tarsal and carpal may be inflamed. The pyemic abscesses when encountered have as a rule soft atonic walls. The predominant organism encountered is of the colon group and offers nothing remarkable in cultures or staining.

The calves which do not succumb to the gastro-enteric, pulmonary or other lesions finally recover a physiologic appearance at 120 to 180 days old, when they shift more or less completely from a milk to a vegetable diet. The pot-belly or gauntness slowly abates, the feces cease to adhere to the tail and buttocks, the harsh, dry coat regains its luster, the masses of epidermal debris in the hair disappear, the animal becomes vigorous and grows rapidly. It then enters upon a period of unusual good health which extends to

puberty. The only trace of the adversity through which it has passed is the matting and staining of the vulvar and preputial tufts and the persistence of more or less numerous nodular elevations in the vulvar and preputial mucosæ, known as the granular venereal disease. The significance of neither the matting of the hairs nor the lesions in the mucosæ is accurately known. We do not believe that during this epoch of apparently unusually good health the animal body is free from the presence of the bacteria which formerly imperiled its health and life, but instead, that such bacteria continue to exist in such places and manner that they produce no clinical evidence of their presence. As stated above, we believe they may exist in considerable numbers in the intestinal or genital tract, in the udder or elsewhere, where for the time being they may lead a virtually saprophytic life. During this time they cause no agglutinating reactions in the blood of the animal. In our researches with the *Bacillus abortus* some young animals appeared, by the agglutination test, to be wholly free, but when they reached breeding age and copulation occurred there was a sudden and marked acceleration in the agglutinating power of the blood of both bull and heifer.

The senior author in his contribution to the report of the Abortion Committee for this meeting has discussed the question of the influence of these infections in the calf upon its fertility as an adult. He believes this the most important consideration in connection with the health of the calf.

The handling of white scours has been entirely too empirical. The breeder has studied the problem but little. He sometimes attributes it to bad feeding and fails to feed well, or he attributes it to infection but fails to disinfect, and finally becomes bewildered and discouraged and possibly attributes it to an act of Providence and abandons the fight.

Some veterinarians find no solid foundation upon which to stand. If they turn to veterinary literature they find a brief jumble of conflicting opinions not seasoned with the presence of facts. They follow one recommendation and it fails, another and the results are disastrous, and after a series of conflicts and doubts settle down to the belief that dysentery in calves is an enigma not subject to scientific control.

Another group of practitioners desert veterinary science as a science and become the devoted protégés of pharmacists, or biopharmacists. Under the direction of these they give this or that

dose repeated at prescribed intervals. If disaster follows, the veterinarian, not the pharmacist, bears the blame. The advertising pages and not infrequently the reading columns of veterinary journals contain brief descriptions, by pharmacists, of white or calf scours, its etiology, and a sure cure, which the establishment has to sell. The practicing veterinarian is being constantly besieged by the energetic propaganda of these pharmacists or biopharmacists with advertisements, circulars and alleged journals, handbooks, etc., etc., recommending their wares and indicating how they should be used. Finally the veterinarian, if he has ever seen any scientific literature upon the subject, forgets it and sees only the endless stream of propaganda in favor of cures. He then succumbs and becomes a puppet in the hands of the pharmacist; when the pharmacist pulls the string the veterinarian jumps. The pharmacist places on the label of the bottle the dose, when and how to give it. The pharmacist makes the diagnosis and prognosis and dictates the method of handling. The veterinarian makes the autopsy and bears the responsibility. It would be difficult to place accurately the blame for this state of affairs, but much of it is due to neglect upon the part of investigators to give to this subject a fair proportion of the attention it richly deserves.

According to our researches the handling of dysentery or calf scours should be based upon certain well-established facts:

1. White scours or calf scours is fundamentally an intra-uterine infection of the fetus, and the first stage in the prevention is to have the uterus and cervical canal of the mother as free from infection as practicable at the time of conception. This involves the scientific handling of the infections of the genital organs prior to breeding. The subject is too large to attempt its discussion here.

2. Post-natal infection readily occurs in a variety of ways.

- a. The cow often has the metritis of pregnancy due to or associated with the infection responsible for calf scours. There is an inevitable discharge of such infection from her genital tract which flows down along the tail or thighs and contaminates the exterior of the teats. From this the calf may take the infection in sucking, or the milker may get it into the milk and feed it to the calf. Or the infection contaminating the exterior of the teat may gain the interior of the mammary gland, multiply there and directly contaminate the milk. For these reasons we have urged, at least in badly infected herds, that calves be not allowed to suck their mothers (or other cows), and that milk be not drawn from the

udder to feed calves without first having washed and disinfected the udder in order to avoid the ingestion of the infection from the exterior of the teats.

b. Post-natal infection occurs by the feeding of sound calves from vessels without sterilization previously used for feeding diseased calves. The evident prevention lies in feeding calves from sterile vessels only.

c. Calves diseased with white scours or pneumonia, or calves suffering from milder infection of the digestive tract due to the same organisms, may transmit the infection to sound calves by contact. Diarrheic feces and infected feces from calves not suffering from dysentery contaminate the bedding, hay, grain, stalls and fixtures. Sound calves swallowing the contaminated food or bedding or licking the sides of the stalls or their fixtures obtain the infection.

When several calves are kept together diarrheic feces become plastered upon the skin and hair of the calves, they habitually suck and lick each other and thus take the infection. We believe it of fundamental and immense importance that the new-born calf be given a clean, isolated stall until it is known to be sound and then permitted to come in contact only with calves known to be sound. The fashionable calf stall of today, built for accommodating two or more calves and having lattice or other open-work partitions so that all calves are essentially in contact, with perfect freedom for the passage of infection from each stall into the adjoining one, is a crime against sanitary principles. The partitions between calf stalls should be solid and the calves should be kept isolated until at least 2 to 3 months old.

3. In all those herds where intra-uterine infection is causing much sterility, abortion, metritis or retained afterbirth, it is virtually certain that each calf born carries within its gastro-intestinal tract at birth a large volume of highly virulent infection essentially identical with that in the uterine cavity of its mother. As a rule it may be hopefully believed that at birth the infection in the gastro-intestinal tract has not yet invaded the tissues but is being held in restraint as in a cesspool. The problem confronting the veterinarian is primarily to largely get the infection out of the digestive tract or to control it effectively within the tract before it has multiplied in volume and intensity and acquired explosive force.

a. Milk offers an ideal medium in which bacteria may grow. The digestive tract contains the bacteria ready to grow in the milk. The body temperature with a considerable exclusion of oxygen and

other conditions favor rapid bacterial growth. Other calf foods equally digestible afford like facilities for bacterial activity. The calf should not, therefore, have milk for a considerable period. We advise, and are experimentally applying the rule, that the first feed of milk shall not be given the calf until it is at least 24 hours old.

b. In the meantime we advise that the gastro-intestinal tract be promptly unloaded of its meconium. For this purpose we have used enemas of warm physiologic salt solution twice daily for several days. The enema is administered by means of a rubber horse catheter attached to a hospital irrigator of 3 to 4 quarts capacity. The catheter is carefully inserted for a distance of 12 to 20 inches. We have not tested other plans.

c. The calf having acquired no experience in resisting invasion by bacteria, we aim to advance temporarily its powers of resistance by liberal doses of calf-scours serum, varying in dosage from 10 to 30 mls twice daily for at least two days. For this purpose we have used a serum purchased upon the market from a reliable establishment.

d. When the calf has reached 24 hours of age or not long thereafter we feed a small ration of milk. At present we are working upon the basis of a ration of whole milk equal to 2 per cent of its body weight, given twice daily. After 4 or 5 days if the calf is well the milk ration is to be gradually advanced until at 10 to 15 days of age the calf may be fed practically all it will eat.

The source from which the milk had best come has received considerable thought. For a time the senior author believed it safer to take the milk from a sound cow, one free from metritis or retained afterbirth, rather than from the calf's own mother in case she was so diseased. Researches have rendered a change of position prudent. It now appears that while a calf carries in its digestive tract many bacteria, these have not caused the formation of antibodies in the fetus. Although the utero-chorionic space contained the same infection, and the blood of the mother according to agglutination tests contained ample antibodies toward such infection, the antibodies fail to pass the placental filter and reach the fetus. Our researches have shown that the blood of a new-born calf generally does not react like that of its mother but fails to agglutinate *Bacillus abortus*, colon bacilli, streptococci, etc., obtained from both the uterine cavity of the mother and the alimentary canal of the fetus. (Some investigators have reported otherwise. They have stated that the agglutinating power of dam and progeny are parallel, but they fail

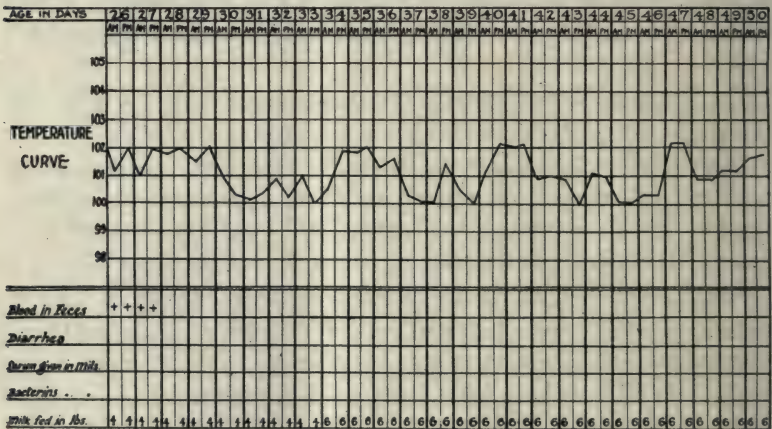
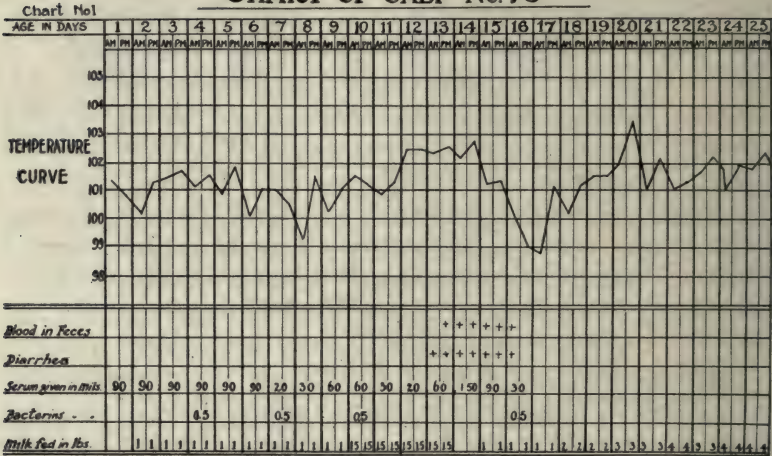
to state the age of the calf. In our researches the calf blood has been almost without exception without agglutinating power at birth, but it acquires such power in 8 to 20 days and is then parallel to that of the mother.) It appears from the researches of others that the milk of a cow bearing infection contains antibodies to that infection. This is apparently borne out by clinical observations and possibly explains the age-old belief that the best food (with rare exceptions) for a new-born animal is the milk from the mammae of its mother. That is possibly because if the new-born animal harbors dangerous infection in its alimentary canal the milk of its mother contains antibodies against that infection, or, to put the thought in different words, the milk of the dam contains properly constituted serum for her calf. This thought is supported by the researches of Forssell of Stockholm in his successful use of the blood serum of the mare in the cure of arthritis in her own foal. It accordingly seems that in the present state of our knowledge, if raw milk is to be fed to a new-born animal, its best source is its mother's udder.

The breeder of pedigreed cattle naturally desires to grow his calves promptly and well, and tends to object to the ration we have thus proposed. Inevitably calves under this plan lose weight so long as held upon the minimum ration of 2 per cent of its body weight. But in our experiments this loss is quickly regained once the calf is properly started on its course.

Simultaneously with the first feed of milk and the third dose of serum we advise the administration of calf-scours bacterins, commencing with a dose of 1 mil and increasing by 1 mil once a day until 10 to 12 mils have been given. The bacterins we believe give a more prolonged resistance to the bacteria harbored in the digestive tube. Once such resistance is obtained, it remains efficient until a natural resistance is built up. The bacterins used in our experiments were made by us in the college laboratory. We have not tested commercial bacterins.

An important element entering into the question of preventing or curing calf scours is that of pasteurized and boiled milk. It is of special significance in herds where tuberculosis exists. Many writers assert that boiled milk will cause scours in a healthy calf. Our researches deny that explicitly. Instead, we would say that a calf bearing an important infection in its digestive tract will break down with dysentery if fed at first on boiled milk; but if the digestive tract of the calf is essentially or wholly sterile, boiled milk is

CHART OF CALF No. 70

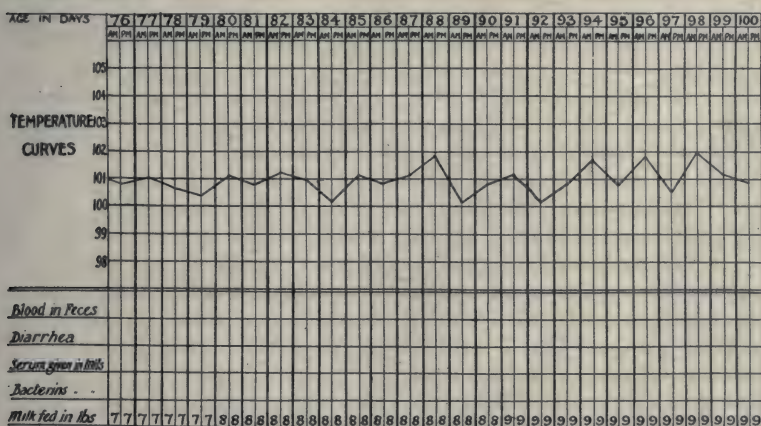
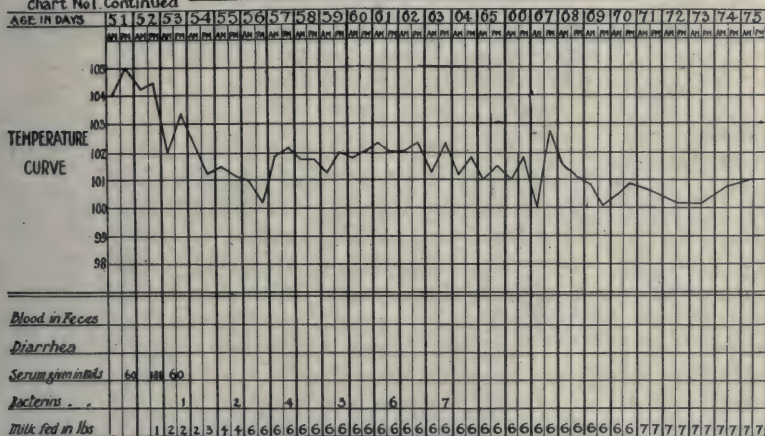


readily borne. In practice there is no safe method for deciding in advance that the calf is free from infection, hence it is perilous to give boiled milk unless certain precautions are taken. Associated with the belief that boiled milk causes dysentery is an age-old belief that the colostrum is essential to the calf. We habitually ignore this teaching with impunity.

There is a controversy, too, over the comparative merits of pasteurizing and boiling. We have not tested pasteurized milk, but in our observations in herds where pasteurized milk is given, we have been wholly unable to see the advantage of pasteurization over boiling. The boiling has the tremendous superiority of affording a large margin for error. If the person who pasteurizes milk

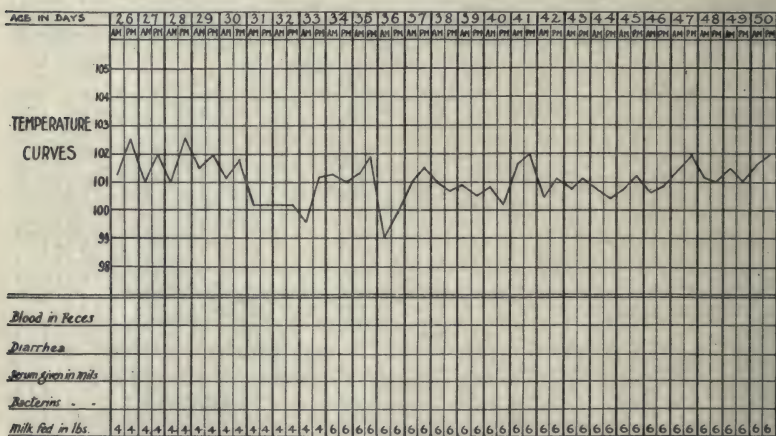
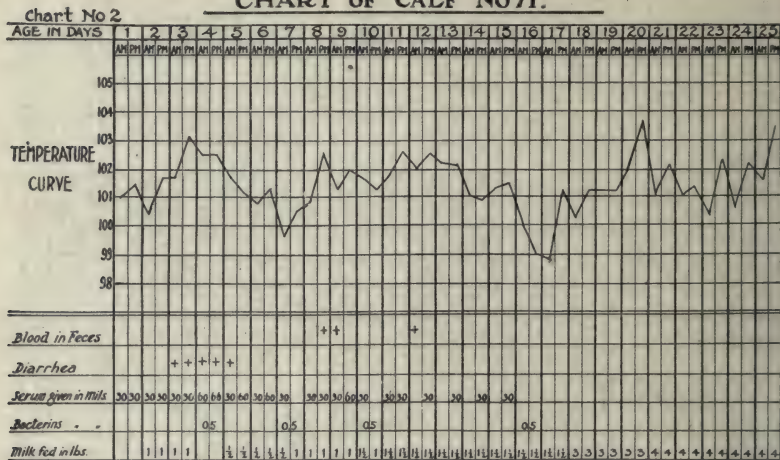
CHART OF CALF NO 70

chart No. continued



errs in the temperature, it is not sterilized and tubercle and other bacilli escape death, while if the boiling falls somewhat short of the technical 212° F. there still remains a margin of safety in sterilization, especially with the most unfavorably known bacteria of milk. In a recent experiment we have gone farther and fed two calves from the start upon milk autoclaved at 15 pounds steam pressure for a period of 30 minutes, which heated the milk to 240° F., or 28 degrees above boiling, so that the milk was a brownish color like coffee. The calves did phenomenally well. These calves bore abundant alimentary infection at birth, and our ability to grow them on autoclaved milk is attributed by us to the luxurious

CHART OF CALF No 71.



use of serum and bacterins until a fair degree of resistance had become established.

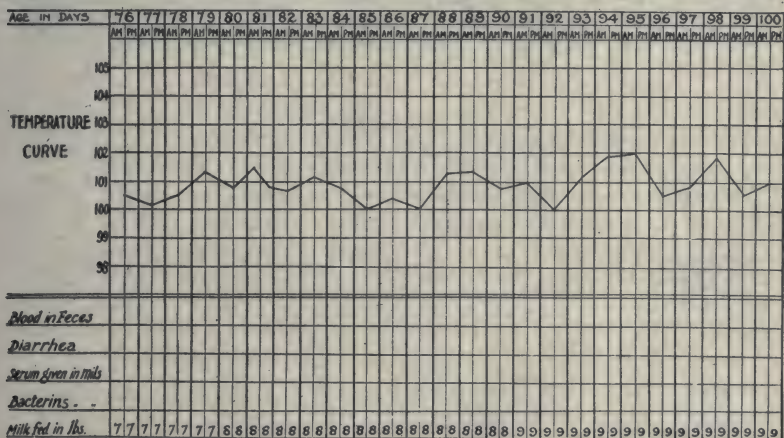
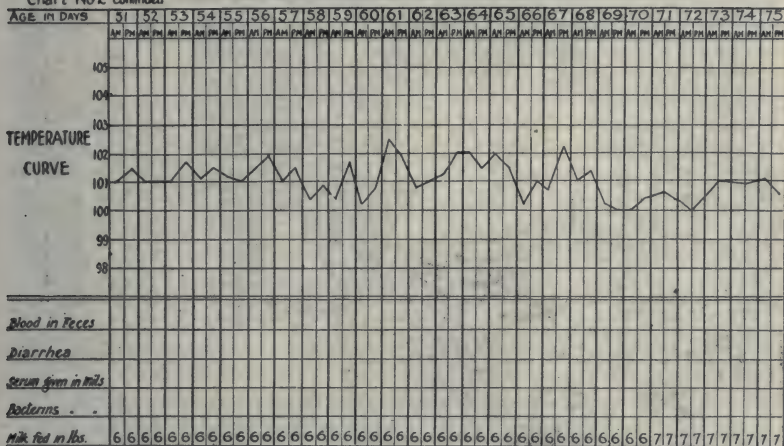
When a calf breaks down with scours or pneumonia, we repeat with some emphasis the plan already related for prevention:

1. We immediately withdraw all food.
2. High enemas of physiologic salt solution are given.
3. Large doses of serum are administered, and as soon as the dysentery is checked bacterins are given freely.

The dosage of serum or the frequency of its repetition are not gauged by the label on the bottle. Our purpose is to control the dysentery, and we gauge our dose by that. We give rarely less than 30 mls at a dose and occasionally 50 to 60 mls. One of the two

CHART OF CALF No 71.

Chart No 2 continued



calves grown on autoclaved milk had 190 mls in one day, and we gave no more simply because no more was required. It is utterly harmless so far as we have yet carried the dosage. We repeat the dose in 2 to 4 or more hours, according to indications, and aim to break the attack promptly and completely in the shortest possible time. We believe this economic. In the case where we gave 190 mls in a day the life of the calf might have been saved with 150 mls, but probably the dysentery would have continued the next day and required another 150 mls to control it, or one-half more serum than by giving the 190 mls at first. After the virulence of the



FIG. 1.—*Calf No. 70 at 88 days*

infection is thoroughly broken the calf is again started on a small milk ration which is advanced as promptly as may seem safe.

The early detection of an impending explosion of the alimentary infection is generally practicable. In all cases observed by us the temperature rose several degrees some hours prior to the breaking of the storm, so that measuring the temperature every 4 to 8 hours has served to warn us of approaching trouble. In many cases also the feces show clots of blood before other changes occur in the excrement. When these warnings appear the prudent veterinarian and breeder promptly act as suggested in the preceding paragraph. Food is withdrawn, heavy doses of serum given, and enemas of physiologic salt solution administered.

We are by no means content when we have prevented or checked a dysenteric or pulmonary storm. We would instead strive toward a far higher ideal. We would avoid the sticky feces which adhere to the tail and buttocks, the pot-belly, the rough, staring coat, the capricious appetite and the tell-tale staining and matting of the hairs constituting the preputial and vulvar tufts or brushes. Experimentally this ideal is quite uniformly available. While the ideal may not be within the grasp of the practical breeder at present, pressure toward that ideal is desirable and the goal is not far beyond his reach.

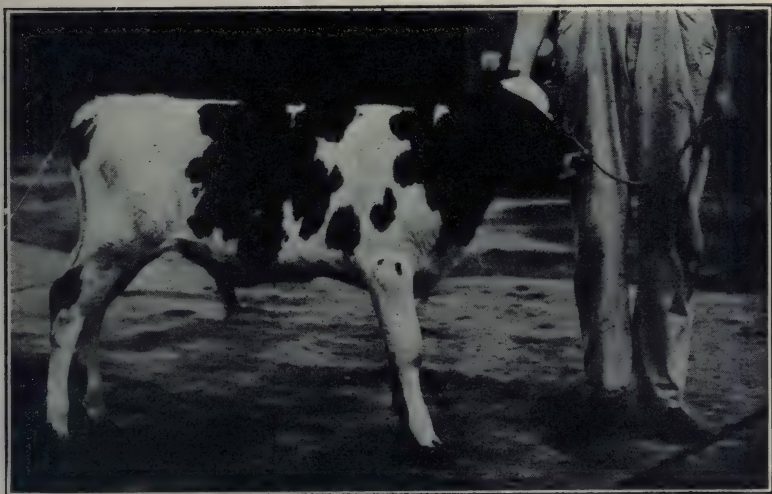


FIG. 2.—Calf No. 71 at 88 days

Overfeeding should be scrupulously avoided, and the definition of overfeeding should be clear. When the intestinal canal is in such a state of infection that the feces are pasty and stick to the hairs of the tail and buttocks, the calf is getting more food than it is digesting, and while it may be starving to death, it is in a sense being overfed. The right amount of food for a calf is what it can digest and assimilate, or somewhat below that point. When a storm of diarrhea breaks, one-half a liter or 1 mil of milk is too much. When a calf is actually sound, no amount of milk, as a rule, is too much if it will take it. The amount of milk to be allowed a calf is like the amount of serum to be given—it all depends upon the calf.

When a calf has had its mother's milk raw for 5 to 10 days with the administration of such serum and bacterins as have been indicated, the calf acquires a resistance to the alimentary and pulmonary infections present which will carry it through any ordinary strain from the feeding of pasteurized or boiled milk.

We then favor, in hand-fed calves, boiled milk. Whether whole or separated and mixed as it may be from the herd, it is safe, and according to our researches the calf is more vigorous when so fed. If desired, as shown by our experiments, the calf may be fed boiled and even autoclaved milk with safety and with ideal results, but the first few days require constant watch with a very free use of serum and bacterins.



FIG. 3.—Calf No. 71 at 95 days, showing clean preputial tuft.

When there is a chronic indigestion in calves several weeks old, with pasty feces and frequently with cough, much improvement can be made in many—perhaps most—cases with the liberal use of bacterins and a careful regulation of the diet. There is not, however, the same satisfaction in handling these old-standing cases as when one is permitted to control the infections before there develops the chronic cachexy with lowered vitality and abundant infection.

The various subordinate or less frequent phases of this infection should receive due attention. The arthritis usually yields to the serum and bacterins provided it has not gone on to extensive abscessation. In the latter case, in conjunction with the serum it may be necessary to open the abscesses freely and disinfect their cavities.

The ulcers and abscesses occurring about the lips, cheeks and face should be given careful attention. The abscesses should be promptly and freely opened and their cavities well disinfected, or, if need be, caustics or escharotics like sulphate of copper freely used.

Many calves when severely infected acquire a badly depraved appetite and habitually eat bedding, rubbish, their own feces and almost anything within reach which is not fit to eat. This should be promptly stopped by the constant use of a good muzzle.

The ideal toward which we are striving is well illustrated by the two calves we have recently fed upon autoclaved milk. Calf No. 70 (fig. 1) is the calf of a scrub heifer, without history, purchased in

advanced pregnancy. The birth was slow, the uterus being atonic. The calf was possibly premature. It weighed 49 pounds, was exceedingly poor and exceedingly weak and dull. It could not stand when helped to its feet at 2 hours old. During the first 10 days she lost 7 pounds in weight. She then began to gain and at 30 days weighed 68 pounds, a gain over weight at birth of 19 pounds, equal to 0.63 pound per day, and at 88 days 145 pounds, a gain of 96 pounds, or 1.95 per cent of body weight per day. That is, a calf weighing 100 pounds at birth would have gained 1.95 pounds per day in order to have equaled the daily gain of this calf. At 135 days she weighed 210 pounds, or 4.3 times as much as at birth. It will be seen by the illustration that she was very fat with soft, furry coat, without pot-belly and in all general respects an ideally developed calf.

She received 1,340 mls of calf-scours serum and 27 mls of bacterins. Chart No. 1 shows that she broke down with dysentery on the thirteenth day. It was controlled, recurred on the twenty-seventh day, and high fever occurred on the fifty-first day. Then followed heavy dosage with bacterins, after which she shows an unusually even temperature tracing.

Calf No. 71 (figs. 2 and 3) was born within an hour of the birth of No. 70, his dam being a scrub heifer purchased with the dam of No. 70. No. 71 weighed 59 pounds at birth. The birth was very prompt and the calf was strong and vigorous. He broke down with moderate diarrhea at 4, 8 and 12 days, and showed high temperatures on the twentieth and twenty-fifth days. He then settled down to a very regular temperature line and so remained until he was slaughtered for veal. He weighed at 88 days 175 pounds, being a gain of 116 pounds, or 1.3 pounds per day, or 2.24 per cent per day in body weight. Fig. 2 shows that he was perfectly developed. The photograph is misleading as to the condition of his preputial tuft. He was so full of play when led out that he constantly dribbled urine. After much work he was finally caught by the camera with the tuft dry and, as shown in fig. 3, clean. When slaughtered for veal his carcass was very fat and the veal of prime quality. He had 840 mls of serum and 2 mls of bacterins. The charts (No. 2) show graphically the elevation of the temperature followed closely by blood in the feces and diarrhea with the prompt fall of the temperature and cessation of dysentery after heavy doses of serum.

The control of dysentery in calves is one of the most many-sided and interesting of problems. It is of great economic interest to

breeders of cattle and of interest to the State and the Nation in the conservation and increase of animal food. It is of interest to the veterinary practitioner as offering a field for usefulness which commands for success scrupulous attention to details and a generous conception of the basic cause and of all the cross currents which surge about the young animal to modify the volume and virulence of pathogenic micro-organisms.

To the research worker it offers a boundless field for careful study. The senior author feels sure the infection in the calf has a profound and lasting influence upon its fertility when it has reached adult life. There is perhaps an even broader field just beyond our present horizon. The problem of sanitary milk for man and especially for children lies close beside that of calf dysentery. We know that the problem of feeding young children is far from solved. When the control of diseases in calves has reached high efficiency it may throw valuable light upon the proper use of milk by man.

One of the difficulties in the path of progress in this field is the economic problem of serum and bacterins. The price of serum has, comparatively, shown a downward trend. Possibly by a wider use its manufacture can be cheapened. There are other possibilities. The work of Forssell suggests possibilities with the serum of the calf's mother, but there are difficulties to be overcome. The prices at which bacterins are sold by some houses are excessive. Their cost being purely nominal and their manufacture quite simple, State veterinary sanitary boards and veterinary departments of State colleges and experiment stations should be able to provide ample material at a nominal expense.

Dr. L. V. Polk, who has been an employee of the B. A. I. for the past 10 years and since 1913 assigned to tick eradication work in Mississippi, where he was Assistant Inspector in Charge, has recently resigned from the Bureau service to accept a position with the Dairy League of New York State. Dr. Polk is a man of considerable ability and educational qualifications and the New York people are to be congratulated upon securing his services.

Governor R. G. Pleasant, of Louisiana, has commissioned Dr. W. H. Dalrymple a member of the Council of Defense of that State to succeed Prof. W. R. Dodson, former Dean of the College of Agriculture, and Director of the Agricultural Experiment Stations, Louisiana State University.

STRONGYLIDOSIS IN HORSES AND MULES¹

By P. J. ORCHARD, *Baton Rouge, La.*

IN reading the veterinary publications during the last few years you will have noticed that an ever increasing space was devoted to various parasitic diseases, which seems to indicate that they were heretofore more or less underestimated in their importance. Especially here in the South the time will approach when we shall have to give a second thought to the farmer's iron-clad diagnosis: "My mule has the bots."

Although we have smilingly shelved the bots together with lampers and the "lost cud," we have learned that our stock is boarding parasites, which causes losses equal to those from anthrax and Texas fever. We know that you cannot raise sheep unless you keep the vermin out of the stomach; we see calves get raggy and perish from diarrhea caused by stomach worms; we are called to inoculate sick pigs and find a worm pill more efficient than the serum.

Somewhat new, however, is the observation that parasites, harbored by horses and mules, can produce pathological conditions which prove just as fatal to these animals as the worms that kill our puppies. This claim of mine, gentlemen, may appear rather radical to many of you; the facts on which I base them I shall try to show to you in this paper. Before doing so, however, I want to point out that a practitioner is talking to you. I am not in a position to give you the life cycle of these parasites involved in all its minute details. I may fail in logically explaining my observations in every detail. I will not even attempt that. I simply want to give you these findings, because I feel convinced that they will form a foundation on which theory and research can build.

I contend that strongylidosis is responsible for two diseases prevalent in our Southern territory with its peculiar climatic conditions: (1) For a sickness for which I find no better name than "wasting disease." (2) For the colic in 90 per cent of the cases.

I will try to give you the symptoms and the causes and the treatment. As to the latter, our endeavor has been so far crowned by success. —

SYMPTOMS

In letters and inquiries, in conversation and telephone calls, we get a history such as this: "I do not know what is the matter with

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

my mules. They eat, they drink all they want, have the best corn, hay and grass, and it looks to me that the more they eat the poorer they get."

Or at other times we see mules with typical symptoms of malnutrition, with long hair, poor, sluggish, dull expression on countenance, with temperature and pulse normal, the visible mucous membrane in most instances showing a yellowish or brownish red discoloration; in the aggravated cases the membrana nictitans is dotted with petechial spots and shows other symptoms of grave indigestion.

Quite contrary to our expectations, the animals display a ferocious appetite and in spite of being allowed an excess of feed they continue to lose flesh. A hostler draws our attention to a peculiar habit that with feed in the box they gnaw the manger, eat the post and fences, eat trash, and prefer to pick over the manure pile to the best pea-vine hay offered.

The action of the bowels generally appears to be normal, although not seldom intermittent diarrhea alternating with occasional constipation is encountered.

The whole sickness bears the symptoms of a chronic trouble. Emaciation continues until finally a stage is reached where the animal's vitality sinks below normal, frequently together with his temperature. The pulse becomes weak and wiry, and the affection of the circulatory system expresses itself in the appearance of edema. It is obvious that little work is required to do the rest.

There is one form where the decrease of vitality seems to proceed to complete emaciation. The patients are introduced with a diagnosis of kidney troubles; the symptoms are extreme weakness in back and loins, occasionally accompanied by discoloration of the urine. Otherwise the animal is in fair condition.

In extreme contrast to this wasting disease are the violent symptoms of the "worm colic" so excellently described by Huttyra and Marek. You are familiar with the two forms they picture so well. You know the mild case that makes your client such a firm believer in his patent colic medicine. Out in the field our mule becomes restless, "squats," and within a minute shows fierce abdominal pains, is unhitched at once, taken to the lot, wallows for 15 or 20 minutes, and after half an hour or two hours may resume work without any bad after-effects.

The violent worm colic is the one that makes us take off our coats and get busy. We then appreciate the fact that chloral hydrate will quiet the patient in a disease the cause of which we are unable to

remove. This form of worm colic is easily recognized by its long duration and the frequent failure of medication. In the start the symptoms are not so alarming; peristalsis is noticeable; to a certain extent there is a slight bloating that does not seem to necessitate the use of a trocar. Even feces may be discharged in the beginning; but soon the outlook darkens; the peristalsis is reduced to an intermittent metallic vibration, or we have indications of gastric flatulence without visible affections of the large intestines, whereby no swelling or tension in the flank occurs. Later on the sensorium becomes disturbed, and the end of the struggle is marked internally by the sinking temperature, externally by icy cold ears and nose, cold sweat, and forcible unconscious movements which I have heard one of the oldest Southern practitioners so fittingly call "the death march."

CAUSES

It was not so many years ago when my client and I felt entirely satisfied that the horse with the described "wasting disease" died with the "swamp fever," and that the mule that we have been treating for 24 hours just naturally died of the colic. But when in the summer of 1917 on one plantation with a herd of 40 mules 12 died in a period of 3 weeks from that "natural" colic, and 5 wasted away, the death rate became both appalling and embarrassing. So we started a postmortem campaign which up to date embraces 160 to 170 autopsies. Out of the findings of these autopsies we concluded that the causes for the "wasting disease" and certain epizootic colic outbreaks were an infestation with parasites in numbers heretofore greatly underestimated. An examination of the professional works on the subject convinced us that they were to be identified with the group of palisade worms more commonly called strongyli.

As the difference between "wasting disease" and colic is a rather striking one, so we believe that different strongyli are strictly responsible for them. We claim that the "wasting disease" is produced by the intestinal strongyli found in enormous numbers in the cecum and large colon, and maybe partly by the form of strongyli found in the abdominal cavity and mesentery in clusters.

Our postmortems made us suspect that the strongylus found in the renal hilum is justly accused of causing the so-called "kidney trouble" in the South. While the parasites found in the intestines and abdominal cavity carry on a passive parasitism, if I may phrase it that way, the examination of the organs of circulation has taught us that the active parasitism of the strongyli found in the blood

system is by far the most dangerous. I am speaking of the aneurisms of the mesenteric vessels. The presence of these pathological conditions always has been a common observation, but the fact that they are more frequent and, in my opinion, of the utmost importance in the South cannot be strongly enough emphasized.

Since we have opened so many colic fatalities we have found in every one of them from one to six dilations of the mesenteric artery which were filled with a blood clot and swamped with strongyli. We became confident that here was the seat of our colic. I will not deny that one aneurism in a minor vessel can remain undisturbed without impairing the health of the animal, but if I try to relieve a case of colic for 12 hours without the slightest success and then find in autopsies several enormous aneurisms, one of them blocking four of the most important arteries of the intestinal tract, then I do blame the worm infestation for the death of the animal. This picture of conditions found in the mule above referred to may prove to you what words might fail to accomplish.

Where blood circulation is blocked to an extent as was the case with this mule it is obvious that no drug could move the bowel that is entirely paralyzed, not to say dead, through lack of nutrition. A dose of eserine or arecoline has in such a case taught us carefulness in its use, as it kills a worm colic in very short order.

While we admit that a sheep with stomach worms will soon infect the rest of the flock, the assertion that a wormy mule can cause an epizootic of wasting disease or colic may seem to some of our Northern colleagues rather far-fetched. The practitioner familiar with the Louisiana sugar plantation knows that conditions here promote the spread of the disease in every possible way. We do not know the individual stall; the manure pile is in the mule lot; the hay is fed in a long rack; waste mixes with manure on the ground, and heavy rains and hot weather cause conditions favorable for dissemination. The common pasture in the low-lying lands, the bad drainage, the contaminated water, assure continuous reinfestation.

TREATMENT

You might be interested to hear how we attempt to control the disease. Intentionally I use the word "control," as the above mentioned local conditions make the eradication virtually impossible. In that point I radically differ from some of the authors of recently published articles on anthelmintics. Our aim is not to get the last

strongylus out of a mule's bowel, because with the next bite he gets after his worm treatment he will get another worm.

Furthermore, a radical worm treatment is not feasible for two reasons: First, many of the diseased mules would answer with death the starving and purging method. Second, as practically every animal is affected, only a general treatment can accomplish results; and if carried out with the radical method no owner would consent. Opposite to the radical method is the old-style condition powder or worm powder in the feed. It will work as long as the mule is not opposed to the taste of the drug.

The secret of our treatment is the individual dose. It matters little whether you annoy your strongylus with oil of chenopodium, santonin, tartar emetic, kamala, or any other anthelmintic, as all these drugs have proved efficient in the use of centuries. But it is very important to make sure that your patients really get the proper dose under proper conditions. By proper dose I mean a dose of the worm drug below the maximum, but given for several days, followed by a purge, according to weight and physical condition of the patients. By proper condition I mean to follow the rule of common sense. The time of extra hard work, hot weather, or cold wave would do anything but help you to success.

From the fact that my firm has treated up to the present time approximately 9,000 head in the past three seasons, you may conclude that the treatment has introduced itself well. It is far from being a complete success, as our worst enemy, the parasite in the blood, is well nigh beyond our reach through oral medication.

We are bending our efforts to find ways and means for an application of powerful anthelmintics that can be introduced into the circulatory system through the jugular vein or subcutaneously. We feel that these drugs have to come from the powerful arsenic compounds, such as salvarsan, etc.

Drs. James A. Waugh of Pittsburgh, Pa., and James B. Paige, of Amherst, Mass., have recently written the JOURNAL that they have a number of full volumes and odd numbers of this JOURNAL and also the *American Veterinary Review*, *Journal of Comparative Medicine and Veterinary Archives*, and the *Veterinary Magazine*, which may prove of value to some institution or individual striving to complete their sets of these various publications. Those interested in such duplicates may obtain more detailed information through correspondence with Drs. Waugh and Paige.

FIELD OBSERVATIONS IN THE CONTROL OF ABORTION DISEASE¹

By GEORGE M. POTTER, *Manhattan, Kans.*

VETERINARIANS everywhere recognize abortion disease as one of their most serious problems. Every particle of information that in any way adds to their store of knowledge concerning it is of great importance to them. The writer, having studied the problems presented by abortion disease over the greater part of a large State for more than two years, believes that an account of his observations may contribute something to the general fund of knowledge and possibly prove helpful to others like himself who are seeking a way to control this disease.

The work of which this paper is a report was conducted under the auspices of the Extension Division of the Kansas State Agricultural College. The writer had been engaged in educational work in the control of hog cholera and other diseases. At the meetings of farmers conducted over a large portion of the State, the questions asked concerning abortion disease were practically as numerous as those relating to the subjects under discussion. The need for work in abortion control was too apparent to be ignored. The writer is one who believes that we have sufficient information concerning abortion disease to warrant an attempt to control it; consequently the matter was laid before the proper persons with the recommendation that an educational campaign for the control of the disease be begun. A conference of the heads of departments interested in the subject was called, and the writer was instructed to draw up a project and undertake the work. Instructions were also given to prepare a bulletin comprising the best available information adapted to Kansas conditions. This bulletin was subsequently published as Experiment Station Circular No. 69, "Contagious Abortion of Cattle."

The work contemplated was of pioneer nature. Except for work done by investigators at some of the foremost veterinary colleges, there was no pattern to follow and no known precedent for systematic work on such a scale. The work had to be pieced together from the mass of seemingly contradictory theories and facts and made to apply to the conditions peculiar to that section. The object was to combat the great mass of misinformation that has grown up

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

about this disease and convey the idea that owners themselves can do much to check the ravages of abortion disease. It was realized in the beginning that abortion control as such would not take readily with dairymen and stockmen, therefore it had to be coupled closely to the campaigns for general herd improvement being carried on by the animal husbandry and dairy departments. Also the known difficulties of treatment and the lack of dependable immunizing agents necessitated that preventive rather than curative methods be taught. In outlining the project it was provided that the work should be conducted with members of cow-testing associations, cattlemen's associations and breeders who were following definite systems of herd improvement. Where success depends on conscientious attention to details and continuity of effort over a considerable period, careless and fickle men could not be used as co-operators. The program was so arranged as to distribute the work among all classes of stock and disseminate information to all parts of the State.

The method of conducting the work was by means of lectures and demonstrations. It was deemed necessary, in view of the chronic nature of the disease, to keep the herds with which we were working under observation for a period of at least a year. Dependable men who wished to eliminate the disease from their herds were chosen as co-operators and arrangements were made to visit them quarterly. At each visit conditions were studied and a lecture given for the benefit of interested owners of the community. Whenever suitable subjects were available, demonstrations of treatment were given. Co-operative work of this kind was conducted in 6 counties pretty evenly distributed over the State. The itinerary was arranged in cycles to avoid needless expense and loss of time.

The subject matter taught consisted of the principles of preventive medicine, and included guarding the herd against introduction of the disease, isolating affected cows to prevent dissemination of infection, treatment of affected cows to promote recovery and preserve the reproductive function, and the building of herd immunity through selection of resistant and immune cows.

Great care was taken to impress the fact of the infectious nature of the disease, and the various complications and great range of symptoms were explained. The cause and the manner in which the inspection spreads were given. Owners were urged to use great caution in introducing breeding animals into their herds and under no circumstances to bring in animals of unknown origin and breed-

ing. They should be watchful to prevent contact with diseased animals.

Limitation of infection through prompt isolation of affected animals and destruction of infectious material was given as one of the cardinal principles of preventive medicine. The danger presented by the discharging but unrestrained cow was enlarged upon.

The urgent necessity of prompt and proper treatment was emphasized. The delicate nature of the reproductive organs, the possible complications and the consequences of neglect or improper treatment were pointed out. An effort was made to impress the importance of competent veterinary service, especially where valuable animals were concerned.

Finally, we sought to convey to the owners the hope we have for the ultimate control of the disease. Especial emphasis was laid on the immunity conferred by the disease which caused it to subside in herd after herd. Where a very large percentage of cows aborted but once and afterwards gave birth to normal offspring, it became almost criminal to sacrifice valuable herds or individuals without an effort to restore them to health. The owner should strive to build up a herd immunity through the selection of prolific, resistant and immune cows and their offspring. Abortion disease was not easy to overcome, but the owner could accomplish much through intelligent herd management to control it and keep down the losses.

The work with dairy herds and beef herds kept under farm conditions followed the accepted methods employed by Eastern workers, but each herd was regarded as a study in itself because of the varying conditions under which cattle are kept. But with the beef herds kept under range or semi-range conditions different methods had to be employed. Little work had been done with range abortion, so it was necessary to develop new methods that would meet the requirements of the disease without unduly disturbing the present system of conducting the business. The writer formulated a plan, based on the control of breeding and common practices of herd management, which was published in Kansas Experiment Station Circular No. 69. Briefly it is as follows:

It is a common practice, in the handling of beef herds, to breed for spring calves. Many consider the first week of April as a favorable time for calving to begin. The bulls would then be put with the herd in the last week of June. Where abortion disease exists the bulls should be withdrawn as soon as sufficient time has elapsed for breeding the herd, in order that the calving period may

be concentrated into as short a space of time as possible. Abortions tend to occur at from 5 to 7 months of pregnancy. Experience has shown that the abortions will then occur from the latter part of November on into February. The cattle at that time are on the feeding grounds where they are under daily observation. All aborters and those threatening abortion can then be removed to a separate inclosure, appropriately treated and retained in isolation until recovery is complete. All that are going to abort will have aborted and been cleaned up before time to return to the range. The cows then go out clean and there are none to disseminate infection, and as most of the aborters will have become immune the disease will subside. Those that would abort a second time would be caught up during the second season.

This plan permits of the employment of the principles already enumerated. Through it the owner protects his herd from contact with diseased animals and prevents introduction of infection. Dissemination of infection is prevented by isolation and treatment of aborting cows. It further limits the spread of the disease, in that abortions are limited to the time of the year when the cattle wander less widely and commingle less extensively. The plan contemplates the building of a herd immunity through culling of the nonproductive cows. The cow that aborts a second time, indicating a lack of resistance, and the shy breeder are sold for slaughter to avoid transmitting those tendencies to any offspring they might eventually have. The cow that produces a healthy calf each year, in spite of the presence of the infection, and the cow that acquires a strong immunity following a single abortion are kept to transmit these desirable tendencies to their offspring. The herd is to be replenished always from the offspring of its resistant members. Consequently, all movement is away from the herd. The necessity of introducing new material that might be either infected or susceptible is thus avoided.

It will be seen that this plan harmonizes with the accepted methods of herd improvement and does not require the abandonment of present herd practices. The writer has seen these principles applied with gratifying results and in a manner that convinces of the practicability of the plan. He recommends this method wherever large numbers of cattle are to be handled, as in large pastures, in forest reserves and wherever a limited range permits of the control of breeding.

To summarize: Control breeding to concentrate the calving period

and bring the abortion at a time when the cows can be kept under observation. Isolate aborting cows and treat them according to approved methods. Retain valuable cows and replenish the herd from its own increase.

Recently work was begun with 14 cow-testing associations. It is believed that by securing the cooperation of such organizations larger numbers can be reached with less expenditure of energy and funds; reliable men, who will be most apt to give control measures a fair trial, will be enlisted; the character of the organization will be most likely to provide the continuity of effort necessary for success, and the results will be more apparent and convincing, likewise more valuable for study, than where scattered widely among an unorganized group. The object is to teach those principles already outlined. The veterinary specialist co-operating with the dairy specialist in charge of cow-testing work will strive to bring about better sanitary conditions and better herd practices for conserving animal health. An effort will be made to secure competent veterinary service where it is lacking and its more extensive use will be urged.

Another enterprise, for which no precedent has been found, was recently started. In western Kansas is a section of open range, roughly 10 miles square, which is used by 30 owners running 2,000 head of stock. The business of raising cattle there is in an unsatisfactory condition and abortion disease has made its appearance on the range. We could not hope to control the disease under those circumstances except through concerted community action. An organization, therefore, was formed for the dual purpose of controlling disease and improving the live-stock industry of that section. The Animal Husbandry Department of the Experiment Station was called on for assistance in working out details, and the Forest Service of the United States Department of Agriculture supplied sample forms for constitution and by-laws. To keep up interest a comprehensive program requiring a period of three years for its completion has been adopted. All phases of the industry will be covered, including breeding, feeding, marketing, pasture management, forage crops, etc. A field day will be held each year to popularize the association and arouse enthusiasm. For controlling the disease the plan already described will be used. All subjects on the program will be given in relation to their effect on the reproductive efficiency of the herd. It is of course too early to say what results will ensue. As a rule success comes slowly in such an undertaking, but there seemed to be no other way and it was worth while to make the effort.

The results we hope to accomplish through this educational campaign are these: To initiate better herd practices by dispelling the ignorance and misinformation now so prevalent among stockmen; to check the losses resulting from the sale of individual aborters and aborting herds; to prevent the sacrifice of valuable breeding animals and the breaking up of purebred herds that may represent the work of a man's lifetime in constructive breeding; and last but not least, to prevent the further dissemination of the disease by breaking up the practice of "unloading" diseased animals and herds.

Work such as the foregoing could not be carried on for long without certain facts becoming apparent, and it is believed that the observations made will interest this audience. The most outstanding fact is the spontaneous subsidence of the disease. That immunity is conferred by abortion disease has been pointed out by numerous other writers, but this paper would be incomplete without emphasizing it further. The disease has subsided in herd after herd where the owners have not become panic-stricken and shipped them. This is such a constant occurrence that the writer does not hesitate to predict the cessation of the disease after two years. Circumstances may, of course, play a part in some cases to prolong the outbreak, and we may have evidence in the form of occasional abortions, retained afterbirths or sterility that infection still lingers, but the heavy losses will have subsided and the disease may then be said to be under control. That immunity is conveyed is proved by the very low percentage of second abortions. In one herd which was large enough to make the figures of value this percentage was as low as $6\frac{1}{4}$ per cent. It is this fact that lends hope to the effort to control abortion disease and impels us to strive in a large way to overcome it.

Another characteristic of breeding cattle has been brought out by the work, which, taken in connection with immunity, will be of great value in maintaining the reproductive efficiency of a herd. One of our co-operators, who is a breeder of large experience and keen observation, has found that certain of his cows produce vigorous calves year after year to a ripe old age, in spite of the presence of the virus of abortion disease. They are exposed in the same degree as others but their resistance permits them to reproduce without interruption. Information from other sources seems to indicate that offspring from these resistant mothers may inherit these same tendencies. These prolific, resistant breeders and their offspring should be invaluable and priceless to a man seeking to develop a fine herd of purebreds. Prolificacy is receiving great emphasis in swine

breeding and it must also receive greater emphasis in our cattle breeding in future.

The experience of the writer leads him to believe that the disease among range cattle is pure abortion disease. This belief comes from the readiness with which immunity is acquired and the relative infrequency of the common complications. Retained afterbirths are not nearly so frequent as among dairy cows; purulent conditions follow less often, and sterility is markedly less. Losses may be enormous, but the outbreak subsides rapidly and a large proportion of the animals recover completely. The time required for the disease to subside seems to bear some relation to the virulence of the attack. The greater the virulence and the larger the number attacked at one time, the more positive the immunity and the more quickly will the herd become immune. A less virulent virus that affects but a few at a time may persist longer in the herd.

The underlying reason becomes apparent when we consider the mode of living of the range cow. She lives a natural life, out of doors, and does not have to combat the stable infections that surround the dairy cow. She has but to produce her calf and suckle it until it can lead an independent existence. She is not subjected to the weakening influence of the artificially stimulated function of milk production of the dairy cow, consequently she has greater resistance to ward off the effects of the disease. Following abortion she has only to eat grass and get well and prepare to produce another calf. This belief is strengthened by the observation that dairy herds in that same region and small beef herds that are confined to insanitary surroundings are affected similarly to dairy herds in other sections.

A knowledge of the manner in which abortion disease is transmitted is of utmost importance. The writer has observed a method of transmission which, if it has ever been reported, has never been sufficiently emphasized. Cows have been observed to lick up the fresh discharge from cows that have aborted. Stockmen, when the matter was mentioned to them, have spoken of seeing the same thing. We recognize the ingestion of the virus as probably the most frequent channel of its entrance into the animal body, and we say that it occurs through contaminated feed. On the range, however, where the acreage per animal is large, the amount of food actually contaminated is small and the chance of its being picked up relatively slight. Moreover, climatic conditions are such that the virus would be quickly killed. Clear weather is the usual order, the sunlight is intense, the atmosphere dry, and the winds assist the desiccating

action. It is quite possible that a single day of bright sunshine would so dry up and sterilize the small masses of discharge that they would be harmless so far as transmitting the disease is concerned. But where these discharges are licked up in their fresh state we have a decidedly different condition. We know that these discharges are teeming with the abortion organisms and but very small amounts of discharge are required to establish the disease. The abortion organisms are taken into the body in a fully virulent and viable state and promptly initiate the disease in susceptible animals. To the writer these facts have great significance as a possible explanation of the manner of dissemination of abortion disease among range cattle. It furnishes one more argument in favor of segregating aborting cows.

The question of the natural period of incubation is one on which we might with profit have more information. Two cases have come to our attention which are worth mentioning. In the first a renter had 7 milk cows with which he had no trouble. He went to a sale and bought another cow. A few days afterwards this cow aborted. He was ignorant of the danger to his other cows and took no precautions to protect them. Several of the cows were in the early stages of pregnancy. After a time 3 of these cows aborted. The approximate time of the first and the later abortions was known, and the interval was about 5 months.

In the second case a ranchman had gone to the stockyards and picked up some cows of unknown origin. In due time they began to abort. He had heard something of the disease, and he very thoughtfully "segregated" the aborters by placing them in his barn lot. This, by the way, he used for corralling his milk cows for milking morning and night. If he thought of these cows at all he considered them safe. They aborted in about 3 months. Fortunately for him, the load of stockyards cattle which aborted had not been in contact with his main herd. They were shipped back to the yards, where possibly they were again picked up by some unsuspecting rancher and taken out to start another outbreak.

These cases not only give an indication as to the length of the period of incubation but they shed some light on the state of mind of the stockman and the problems confronting the sanitarian. The question of the incubation period is one which has a very practical bearing on the measures we adopt for eradication and is one that stockmen frequently ask of the investigator.

This paper would not be complete without a word of appreciation for the intelligent assistance rendered by conscientious county agents.

Some veterinarians have made violent and indiscriminate attacks on county agents. Where there is still so much poor veterinary service these attacks can only react disastrously on the profession. No one denies that many county agents have been guilty of ill-advised and pernicious activities, yet there is a far larger number who are willing, nay, anxious, to meet the veterinarian more than half way and co-operate with him in building a better animal husbandry. We wish also to commend very highly the public-spiritedness of those men who co-operate with us in the work. Where many feared to work with us because of the supposedly unfavorable publicity it would bring, these others forgot themselves in the desire to be of service to their communities. We venture the assertion that whatever publicity they may get will be altogether in their favor.

The experiences of the work seem to warrant certain recommendations:

The greatest progress in the investigation and control of abortion disease can come only when laboratory investigation and field work are combined. Neither alone can reach its maximum efficiency. The field worker must be an investigator as truly as the laboratory man. Many cases come to the attention of the field man that should be thoroughly investigated by laboratory methods. On the other hand, the laboratory man needs the experience and observations of the field man to supplement his work. Many times the writer would have welcomed the opportunity to carry certain problems into the laboratory.

One of the greatest needs of the work at the present time is the correlation of its various phases. Our present medical knowledge is altogether inadequate for controlling abortion disease. We must join with the animal husbandman in working out a system of hygiene that will be practicable for the stockman to put into operation on his farm.

The work must be directed by proper persons. In the writer's experience, laymen who, without knowledge of the disease or conception of its requirements, assume to direct operations have often proved to be a more serious obstacle than the difficulties of the work itself.

Finally, we must convey to the live-stock interests the hope that is in us for the ultimate control of abortion disease. The more the writer studies the situation the more firmly convinced is he that the disease can be controlled. Let us go on with the knowledge we now have, and learn by doing. Let us preach the hopeful view.

THE PURPOSE AND SCOPE OF VETERINARY EXTENSION WORK¹

By L. C. KIGIN, *Lafayette, Ind.*

THE purpose of all extension work is to educate the masses along certain lines of work that will be beneficial to community welfare. In this article I shall limit myself to one phase of extension activities, namely, veterinary extension work. For convenience and clearness I have classified this subject under the following heads: Disease-prevention work with veterinarians, and disease-prevention work with farmers.

Both of the above lines of educational work are important, but the former is far more vital to the live-stock interests than the latter, for many reasons. If the veterinary profession takes the place it should in rendering service to the live-stock men of this country, every member of the profession must be kept informed regarding results of all lines of research work that may be of assistance to him in solving the many problems that confront him, thereby enabling him to render more efficient service to the community in which he is serving.

EXTENSION WORK AMONG VETERINARIANS

In Indiana we started our extension work among veterinarians in March of the present year. This particular series of meetings ran for one week in different sections of the State. The subject discussed was the differential diagnosis of swine diseases. Dr. W. W. Dimock of the Ames, Iowa, Division of Veterinary Science accepted our invitation to come to our State and discuss this important subject. The meetings were well attended, and the interest manifested encouraged the holding of future meetings.

The second series of meetings was held the first week of June, when Dr. W. E. Cotton, of the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., discussed contagious abortion.

The third series of meetings was held the second week of September. Dr. E. T. Hallman, of the Michigan Agricultural College, discussed and demonstrated his method of diagnosis and treatment of sterility among breeding cattle. Clinic material was provided for each meeting.

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

Every wide-awake practitioner in the State attended some or all of these meetings; however, it required special effort to interest many busy practitioners and convince them that they could afford to give valuable time to attend these meetings. Letters were sent out as far in advance as possible announcing the intended meetings. A follow-up letter was then sent out as soon as arrangements had been completed, giving date, time and place. A third letter was sent as a general reminder just a few days in advance of the meeting. The follow-up letters required much additional work, but we believe this method is largely responsible for the good attendance.

Our plan in the future is to hold series of quarterly meetings. In case it is deemed advisable to hold an extra meeting to discuss some important phase of preventing the spread of a certain disease, we shall do so. Such publicity should be given this educational work as will show farmers that an effort is being made to help the practicing veterinarian to be better able to serve him when he needs his services.

The Extension Department, State Veterinary Department and Bureau of Animal Industry should co-operate in such an undertaking. The State Veterinary Department and the Bureau of Animal Industry, Division of Hog Cholera Control, are deserving of much credit in making the meetings that we have held a success. Today every State has an extension department, and they should be giving some aid to the veterinary profession. It was an easy task in our State to start this move. Our Superintendent of Extension Work could see instantly the opportunity for advancement if such work was properly directed. He has given all the encouragement and aid possible in making these meetings a success. What has been done in Indiana can be done in other States if a concerted effort is made by the veterinarians of the State.

EXTENSION WORK AMONG FARMERS

No veterinarian doing extension work can reach as many farmers with his message as the local veterinarian. Therefore it would seem advisable to try to disseminate his teachings through this channel. If we fail to recognize this opportunity the maximum results will not be accomplished. Meetings in the rural districts to inform the farmer relative to the nature of hog cholera and other infectious diseases have been an important factor in controlling such diseases, but are we sure it was advisable to devote our best efforts along that line? The weak link in the chain was the inability to reach the

men in the community who would stay away from the meeting, but who needed the information worse than the participants. How, then, can such men be reached? I think through the local veterinarian who visits many such farms daily.

Of course we can not expect the local veterinarian to carry our message unless we give it to him and direct him in a way to use it. The most satisfying and convincing argument we can put up to the farmer is service. It seems to me this should be the uppermost thought in any extension veterinarian's mind. - What does it gain a man to talk to a body of farmers, lauding the value of veterinary science, but neglecting to make such scientific services possible? Every well-built house has a good foundation to stand upon. The same thing is true of all structures. Misunderstanding and lack of co-operation are deadly enemies to progress. This has been the case with veterinarians and farmers too generally throughout our land. The opportunity for extension veterinarians to diminish such a condition has no limit. The scope is beyond our power of comprehension. Great accomplishments will never be made by keeping the farmer ignorant of many phases of disease prevention, but the untiring efforts of every veterinarian to perform his work more scientifically each day will elevate his professional skill in the minds of all his clients, and would tend to discourage the desire of the farmer to try his hand, for instance, in vaccinating his own hogs as well as his neighbor's. To pass laws forbidding him the right to exercise his own judgment relative to doing his own veterinary work is becoming a more difficult task each year.

We are now passing through a reorganizing period; the time is here for policies to be changed. Those we have tried and proved valuable should continue; others that are worthless should be discarded. This may necessitate organized effort, but it will surely be worth the effort. Every accomplishment worth while has required sacrifice and effort on the part of those interested in its advancement.

WORKING WITH COUNTY AGENTS

Let me say, first, that the county agent in Indiana is too busy with other matters to practice veterinary medicine and surgery. I realize we are more fortunate than some other States along this line, but there is a reason. Proper leadership is responsible. We ask for the co-operation of the county agent in putting on farmers' meetings; he makes arrangements for meeting places, sends out notices of the meetings to the farmers of the community, and takes part in the

discussion of the subject, but confines his remarks mostly to the management side of the problem. The subjects we discuss before a body of farmers are sanitation and the methods of controlling infectious diseases. We discourage the farmer in attempting to diagnose or treat any disease, but insist upon his calling in his local veterinarian. This method has seemed to meet with general approval in Indiana.

In conclusion I want to emphasize the importance of veterinary extension work in as many States as possible in the future, as the farmer should be taught the importance of consulting his local veterinarian whenever disease appears in his herd. Furthermore, the farmer should be directed along intelligent lines of disease prevention. The importance of farm sanitation and herd management can never be over-emphasized. Also the closer we can bring the farmers and veterinarians together the more effective will be the control of animal diseases in this country.

Dr. A. C. Kirby, formerly of Page, North Dakota, has sold his practice to Dr. H. C. Vestal of Dossel, Minn., who will assume charge immediately. Dr. Kirby will make his future home at Carthage, Missouri.

Dr. B. C. Parker of the States Relations Service has been making a tour of Alaska but will shortly make his headquarters at Kodiak, where he will assume charge of certain veterinary matters for the Territory. He believes Alaska has a great future and that the veterinary profession has a big opportunity in this relatively new field.

Dr. Jirozo Noguchi, Chief Expert in Animal Industry, of Chosen, Japan, is visiting the United States for the purpose of studying the organization of the Bureau of Animal Industry. He is likewise investigating policies of disease control and the methods employed in horse and sheep husbandry.

Dr. H. S. Murphey, Professor of Anatomy at Ames, Iowa, spent a week in Washington recently, attending the convention of the American Association of Anatomists.

Dr. I. C. Mattatall, Veterinarian for the Health Department of the Panama Canal Commission, is spending a well earned vacation of three months visiting his many friends in the United States.

THE UNITED STATES ARMY MEAT SUPPLY¹

By Major GEORGE A. LYTLE, Veterinary Corps, United States Army

IN presenting the relation of the Veterinary Corps to the United States Army meat supply, it is believed this subject will be found important as well as interesting and that the results of this work will be shown to be satisfactory. This work is important because of the value of the products handled in comparison with other work of the Corps. The Army horses, estimated at 306,000, having an approximate value of \$200 each, showed a total money value of \$60,200,000, whereas the total value of meat and dairy products inspected at central purchasing points was \$474,000,000, almost seven times the value of the horses. Important also because of its intimate relation to the health of the troops. The health of the public animals is essential largely from a financial standpoint, while the health of the troops has a far more important significance. Important also for the reason that the meat scandal of the Spanish-American War has left an impression on the minds of the American people which will never be eliminated. Therefore, in accepting the responsibility for the quality and condition of the meat foods for the American Army, the Veterinary Corps did so conscious of its full importance. It is interesting for the reason that like much of the work of the United States Army, the inspection of meat and dairy products was developed under the pressure of constantly increasing purchases. There was little time for deliberation or careful planning. Few trained men were available at the beginning of the war, consequently the work of instruction was carried on conjointly with the extension of the work. That this work was satisfactory will be shown by statements of purchasing officers.

The meat supply for the United States Army is calculated from what is known as the ration allowance—that quantity of food allowed by the Army Regulations for the subsistence of one soldier for one day. This allowance includes, in addition to the meat component, flour, fresh vegetables, dried vegetables, dried fruit, coffee, sugar, milk, butter, vinegar, etc. The meat allowance of the ration is 20 ounces of fresh beef or mutton, or 16 ounces of canned meat or fish, or 12 ounces of bacon, the usual proportion of these articles being 50 per cent of fresh beef, 30 per cent of bacon, 10 per cent of corned beef and 5 per cent each of canned roast beef and

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

corned beef hash. With these figures as a basis we can easily determine the quantities of the various meats or meat products necessary to supply an army whose strength is known. For example, we know that for every thousand men in the field there must be supplied daily 625 pounds of fresh beef (or mutton), 225 pounds of bacon, 100 pounds of canned corned beef and 50 pounds each of canned roast beef and corned beef hash. In addition to these amounts there must be established a reserve of these supplies to be used in case of accidents, as wrecks, fire, capture or destruction by the enemy or elements.

The determination of the meat requirements of an army, then, with the ration allowance as a basis and the strength of the army or command known, is but a matter of multiplication and production. When, however, the military strength numbers up into the millions the matter of production becomes a real problem. For example, an army of 4,000,000 men will require a daily allowance of 2,500,000 pounds of beef, fresh, 900,000 pounds of bacon and 300,000 pounds of meat, canned, requiring a daily supply of more than 10,000 cattle and 22,000 hogs. These figures will give some idea of the task of maintaining a meat supply for an army.

The Director of Munitions in his report for 1917 and 1918 has presented this matter in a most impressive manner. He visualizes the American Army of 3,700,000 soldiers as one gigantic figure in khaki, compresses the war period into one hour, "the dinner hour," and the amount of food issued into a single meal. He says: "Let us start off with the main course; the roast of beef placed before this giant weighs 800,000,000 pounds; this is flanked by a rasher of bacon weighing 150,000,000 pounds more. The loaf from which his bread is cut required over 1,000,000,000 pounds of flour in its making, and to spread it required a lump of butter weighing 17,500,000 pounds, and another lump of 11,000,000 pounds of oleomargarine. As a side dish there is provided 150,000,000 pounds of beans, baked, more than half of them delivered in cans, already cooked and flavored with tomato sauce. The potatoes for this meal weighed 487,000,000 pounds, and to add gusto to his appetite there were served 40,000,000 pounds of onions. Scattered over the table are such items as 150,000,000 cans of peas, corn and string beans. His salad contains 50,000,000 cans of salmon and 750,000 tins of sardines. The large bowl of tomatoes received 190,000,000 tins of solid pack, and for dessert he had 67,000,000 pounds of prunes and 40,000,000 pounds of evaporated peaches and apples. The sugar for sweetening the

various dishes on the table weighed 350,000,000 pounds, and he washed it down with a draught made from 75,000,000 pounds of coffee diluted with 200,000,000 cans of evaporated milk, and for this meal the American people paid \$727,092,430.44. It is estimated that each soldier weighed 12 pounds more at his discharge than when his enlistment or the Selective Service Act brought him into the Army, hence this giant arose from that meal with 45,000,000 pounds of added brawn and energy which will be felt for generations to come."

It was in the preparation of the meats and dairy products for this meal the Veterinary Corps had its part. The beginning of the war found the meat-inspecting force of the Army limited to three Regular Army veterinary officers in the United States, three civilian veterinarians, and one retired enlisted man. The former were stationed at Chicago, Kansas City and Buffalo, the latter stationed at San Antonio and El Paso, Tex., and Little Rock, Ark., while at Omaha a retired quartermaster sergeant had for a number of years looked after the meat purchased at that point, in addition to his other duties. These men were in no way connected, and what little uniformity in the work existed had been established through the interchange of purchasing officers. Chicago, being the important meat-producing center, was perhaps the most firmly established. For many years the veterinary officer on duty at that point had been associated with a school of instruction for quartermaster officers and enlisted men in subsistence procurement including inspection. This association had made him familiar with every phase of the work and won for him the confidence of, and an intimate acquaintance with, a considerable number of subsistence procurement officers.

Prior to April, 1917, the work of the Chicago Depot had been going along very quietly, the monthly requirement purchased approximating 150,000 pounds of meats, canned, and 500,000 pounds of bacon. During that month (April, 1917) the total value of the meat foods purchased, at that depot, was \$304,000. In March, 1917, when war seemed altogether probable, there being no veterinary officers available, the Chicago inspection force was increased by the addition of two civilian veterinarians, and in April three men were added to the Kansas City force and force established at the New York Depot. As soon as Reserve Corps officers were available the civilian veterinarians on meat inspection duty were recommended for and received commissions, and request was made to the Office of the Surgeon General for additional personnel, which request was

promptly granted. For the most part these reserve officers were young and inexperienced, requiring constant supervision and direction, but a few of them were experienced, and all of them were eager and willing. The value of meat purchases, which was \$304,000 in April, increased to \$1,275,000 (4 times) in May, to nearly \$3,000,000 (10 times) in June, and to more than \$5,000,000 (16 times) in August. In April the officer in charge of the inspection work in Chicago, "in addition to his other duties," was appointed a member of a Board of Veterinary Examiners for the examination of applicants for commissions in the Veterinary Reserve Corps.

The need for proper supervision of the meat supply for the Army was felt early, as evidenced by the request from zone supply officers for the assignment of Bureau of Animal Industry inspectors to depots, camps and posts. Upon request of the Secretary of War, a number of Bureau employes were assigned to this work, but the increasing work of the Bureau and the shortage of help due to the draft and enlistments in the Army made their releases at the earliest possible moment necessary, and in May, 1917, a recommendation was made to the Office of the Surgeon General for the establishment of the school of instruction in meat and dairy inspection at Chicago, from which officers might be drawn to cover the inspection work at camps and posts in order to release the Bureau employes. In June the first group of 30 arrived for instructions. Bear in mind, please, the increase in purchases indicated above.

The entire meat procurement, including supplies for camps and cantonments, was now centralized in Chicago, and with it the inspection. Traveling inspectors had been sent out to standardize the work and establish a comprehensive system of reports, and the work was placed on a uniform basis. But the extension of the work had taken practically all of the men who had by now become familiar with the various operations, and a new force had to be organized. Had the recommendation for the establishment of that school of instruction not been made at an early date it probably would not have been made at all. No classroom was now available at the Depot, every available square foot being required for quartermaster corps operations and storage. The experienced men were scattered to points outside of Chicago, and the work increased as has been indicated above, some of the packing plants now being in full operation night and day. To make matters worse, "that 30" came straggling in by twos and threes over a period of weeks, and not until a wire had gone to Washington was information received as to the number

being sent. I fear those "rookies" did not receive a very cordial welcome. However, one of the large packing houses very kindly furnished a most delightful classroom and the necessary equipment. The new men were paired off with the older ones, and thus with lectures and daily conferences the work went on. By August the value of the purchases had gone to \$5,000,000, in September to \$5,500,000, and to \$8,500,000 in October. The meat-producing industries began to feel the weight of the constantly increasing demands put upon them. Additional delivery points were sought out and inspectors assigned to them.

Contractors began to urge a modification of specifications and a relaxation of the inspection on the ground that it was impossible to furnish the quantities of the quality required. Some of their requests were granted. The "square cut bacon bellies" gave way to the "extra short clear" in order to utilize a larger proportion of the hog, and the minimum weight of dressed beef carcasses was reduced from 500 pounds to 475 pounds, and later to 450 pounds and then to 435 pounds. No changes in the specifications were made, however, without consultation with the veterinary officers, who, because of their intimate knowledge of existing conditions, were in a much better position than the purchasing officers to determine whether such changes were necessary. Many proposed changes were shown to be unnecessary and advanced only in the interest of the contractors.

A development which still further taxed the inspection force was the establishment of a chain of freezers to hold the necessary reserve of frozen beef. New York City alone had a freezer capacity of 100,000,000 pounds, and from New York the line of freezers traced back through Elmira, N. Y., Scranton, Pa., Buffalo, Cleveland, Detroit, Chicago, Des Moines, Omaha, Denver, Pueblo, and Ogden, Utah. Into these and 38 others was shipped fresh beef to be frozen, and from them went out frozen beef to the seaboard as required.

Let me pause here just long enough to tell you just what part the Veterinary Corps took in this work. As you may know, practically every article purchased for the Army is covered by a printed specification. That covering the fresh beef is as follows:

"1. *Beef, fresh*: To be good in quality and condition, fit for immediate use, and equal numbers of fore and hind quarters to be delivered, including all the best cuts; hanging tenderloin and kidney fat removed; no carcass to weight less than 450 pounds when trimmed; necks to be cut off perpendicularly to the line of the vertebræ, leaving but 3 cervical vertebræ on the carcass; the shanks

of fore quarters to be cut off 2 inches above knee joint and of hind quarters at the hock joint (commercial cut), and to compensate for the shank bone thus allowed to remain 3 1-2 pounds will be deducted from the weight of each hind quarter; difference in weight between fore and hind quarters not to exceed 25 pounds per carcass (one rib to be left on each hind quarter). Neck, kidney fat, beef from bulls and stags and from females (except from spayed heifers) will be excluded from delivery.

"Such quantities of fresh meat as may be required by the Quartermaster from time to time shall be delivered to him in bulk at the quartermaster's storehouse or other designated place on such days and at such hours as he may prescribe under the direction of his commanding officer.

"When it is proposed to furnish fresh beef at posts at temperature not greater than 50° F., that fact will be clearly stated in bid."

Specifications covering the other meat food articles are equally ample and comprehensive.

The Veterinary Corps personnel reported upon the sanitary condition of factories and freezers and selected practically every carcass of beef shipped to the United States Army abroad or used in the manufacture of canned corned and roast beef.¹ After selection, the beef carcass was trimmed, quartered, weighed, sacked, marked, loaded properly and into cars which were clean and substantial and well iced under their supervision, and the car number and seals were reported to the veterinarian on duty at the freezer to which it was consigned. Upon arrival at the freezer the veterinarian on duty there received the car from the carrier; if it could not be unloaded promptly he saw that it was kept iced. When unloaded he examined the contents, saw that the beef was spread to insure rapid and uniform freezing, kept track of the lots, removed the covering from a few quarters to satisfy himself as to its condition, and reported faulty trimming or inferior quality. He inspected outgoing shipments to see that the products were properly frozen, that the cars into which they were loaded were clean and properly cooled, that quantity and weight loaded were correct, and inserted the necessary figures on billing furnished him. The veterinarians saw meat for canned products boned, trimmed, cured, cooked and canned in a sanitary and proper manner, watched the closure of the cans and the lacquering of them, saw them tested for defective cans before being boxed, examined the boxes, supervised the marking and strapping,

¹As stated by Dr. C. J. Marshall, former Assistant Director of the Veterinary Corps, in his paper on "The United States Army Veterinary Corps Service of the Interior," page 482 of the February JOURNAL, the Bureau of Animal Industry conducted both the antemortem and postmortem inspection on all animals slaughtered in official establishments, the meats of which were later prepared and handled under the supervision of the Veterinary Corps of the Army.—EDITOR.

counted the cases into the cars, and furnished seals and car number, together with other data for the accomplishment of the bills of lading, and in more than half of the cases accomplished the billing themselves. With the bacon they watched the selection, trimming, piling, curing, overhauling, brushing, smoking, wrapping, boxing or canning, weighing, marking and shipping. Hams were all selected, tried, smoked, wrapped, weighed, boxed, marked and shipped by this Corps.

Reports were made each morning showing the various operations carried on the preceding day, the amounts of beef accepted and shipped, the quantities of bacon placed in cure, smoked or canned, the number of cans filled, amounts of beef received at or shipped out of freezers. All movements of fresh beef were reported by the veterinary officers by wire at the close of each day's business. These data were used by the Purchasing Officer in his work of procurement.

The manufacture of oleomargarine and butter was carefully watched, windows screened, ample drainage required and the necessary sanitary precautions taken. The experiences with centralized butter and its manufacture prompts the statement "Supervision of these plants is badly needed" and was responsible for the recommendation that no centralized butter be purchased by the Army unless manufactured under strict sanitary conditions.

Of the hundreds of millions of dollars expended for meat food products from April 1, 1917, to March 31, 1919, not one dollar was paid without the certification by a veterinary officer.

At camps these officers supervised the supply of meat and milk, inspected it upon receipt, supervised the storing, handling and issue, and saw that the wagons were clean and the meat was handled in a sanitary manner to insure its delivery to the kitchen in good condition.

In November, 1918, a very vigorous effort was made to have the work of selecting the army beef taken out of the hands of the Veterinary Corps and placed, together with the selection of beef for the Navy, Marine Corps, and the Allies, in charge of the Bureau of Markets. This effort was approved by the Secretaries of War and Navy, but was abandoned after a two weeks' trial. In fact, it was never inaugurated, as the Bureau of Markets had neither the men to do the work nor the necessary knowledge of the Army and Navy requirements to carry it on.

Meanwhile the values of meat purchased were steadily climbing. In January, 1918, they had gone from the \$8,500,000 in October to

more than \$16,500,000, and by April were more than \$25,000,000. During this enormous increase the work of training veterinary officers and sending them out, whipping up the slow, restraining the overzealous, adjusting controversies, fighting off interference, keeping the men informed and satisfied, had been going on.

Before the first of the year 1918 it became evident that non-professional men would have to be used wherever possible to release the veterinarians from all but the strictly professional work, and authority was requested for the induction of experienced packing-house men into the service. Upon receipt of this authority the packing houses were canvassed and a most efficient body of men secured. These men came from superintendents' offices and from the sales and manufacturing and curing departments, all alert, competent, high-priced, caught in the draft and anxious for station where their services could be used to the best advantage. These men proved to be a valuable addition to the inspection force during the months that followed.

The first group of student officers were assigned duty as camp meat and dairy inspectors in July, 1917, most of them to replace inspectors loaned to the supply officers by the Bureau of Animal Industry early in the war and whose services were now needed by that Bureau. The inspection work of the Corps at Washington was in a formative state, and probably because of their acquaintance with the members of the Chicago force these students took their problems and troubles to that office, and while no authority had been granted for such action a line of correspondence was carried on with officers in order to give them such assistance as seemed needed.

In February, 1918, the Office of the Quartermaster General began to arrange for the manufacture and canning of creamery butter at producing points. It was learned that it was intended to have this work done under the supervision of inspectors from the butter and egg boards. The services of the veterinary inspection force were offered and accepted. There were already two experienced butter men on the force at Chicago, and under them a special class of five officers was organized for a course of intensive training in this work. By the time arrangements for the purchase of these supplies were completed the men were ready, and in May and June they supervised the making and canning of more than a million pounds of butter. This class afterwards rendered valuable service along this line. When in September, 1918, the Army commandeered 80 per cent of the butter in cold storage in the United States these men graded,

weighed and certified for payment 6,217,897 pounds of butter having a total value of \$2,881,226.27, and more than 3,000,000 pounds of cheese valued at \$900,000 more. A large measure of the credit for the success of this undertaking is due to Dr. Charles C. Wright, now with the City Health Department of Portland, Oreg., and Dr. J. C. Wheat, with the Sheffield Farms Co., stationed at Malone, N. Y.

All this time the meat purchases were still increasing. In August, 1918, they had exceeded \$33,500,000 in value; in September, \$34,500,000; in October, \$50,500,000, and in November, when the armistice was signed, they had reached a total valuation of \$51,397,344.90.

Long before this point was reached, however, things were going smoothly with our work of inspection, and time was found to make tests in connection with the boning of beef for oversea shipments in the effort to save shipping space. The test proved to be a success, as evidenced by the following cabled report from France: "On account of issuing 16 ounces of boneless beef for 20 ounces carcass, the cost of boneless beef is only one-half higher, which is more than offset by saving in ocean freight." Basing ship's ton at 40 cubic feet at \$100 makes the cost of ocean freight on carcass beef 12½ cents a pound on account of carcass beef piling 2,000 pounds per 100 cubic feet. Boneless beef piles 2,000 pounds per 50 cubic feet, or a freight rate of 6½ cents a pound, which represents a saving of \$73,000 a day based on present daily issue. While every effort was made to supply boneless beef for oversea shipment in order to save all shipping space possible, its production was limited by a shortage of boners; men could not be taken from the work of boning beef for army canned meats, and this work required nearly all of the available supply of skilled laborers. However, from October, 1918, to March, 1919, almost 39,000,000 pounds of boneless beef had been delivered.

With the signing of the armistice production of meat products fell off rapidly. Due to the fact that contracts had been placed for three months' supply in advance, it could not be entirely checked at once. By March, however, only a trifle over \$18,250,000 in value were delivered, when all contracts were closed and the story of the meat supply for the American Army during the world war was brought to an end.

The Veterinary Corps inspected at purchasing points from April, 1917, to March 31, 1919, the following products:

	Pounds.
Beef, fresh, frozen.....	448,525,595
Beef, corned	199,611,056
Hash, corned beef	100,331,228
Roast beef, canned.....	128,115,860
Mutton, fresh	214,700
Pork, fresh	12,524,635
Bacon	296,864,734
Ham	19,007,921
Deviled ham	26,421
Salt pork	4,000
Pork sausage	4,942,504
Lard	2,196,628
Lard compound	45,000
Lard substitute	8,370,038
Sausage, Vienna style	6,144,405
Oleomargarine	15,382,302
Cheese	8,811,026
Butter	8,522,689
Turkey	2,137,699

This represents a total of 1,261,728,441 pounds, having a money value of \$473,914,827.62, not to mention 234,153,619 pounds inspected at camp, 31,454,566 pounds of meat inspected, packed and shipped for civilian relief work in Europe, and almost a million pounds of beef, fresh, frozen, inspected for the Italian Government. In all 10,956,408 pounds were rejected, making a grand total of 1,779,848,621 pounds.

From April, 1917, to November, 1918, the meat-inspection force at procurement points had increased in personal to 78 officers and 109 enlisted men, located in 102 meat-producing establishments, in 31 cities, who had been on duty at one time or another during that period at 47 procurement points. In the school 82 officers and 96 enlisted men had been trained and recommended for assignment to camps and 116 applicants examined for commissions in the Veterinary Reserve Corps.

The close of the war found enormous stocks of meat stores in the supply depots. These are being given a piece inspection by our force to enable the Government to make reclamation for defective cans delivered and to protect against loss by deterioration. It finds a comprehensive system of sanitary inspection firmly established, with veterinary detachments, numbering in all 32 officers and 87 enlisted men, in every one of the 10 subsistence procurement zones in the United States, together with sufficient personnel in China, the Philippine Islands, the Canal Zone and Porto Rico. The work of

instructing veterinary officers and enlisted men is going forward in a satisfactory manner, 12 officers and 22 enlisted men being at present enrolled.

That the work of the Corps is appreciated is evidenced by the fact that when October 30 threatened to deprive the general depots of the veterinary personnel the zone supply officers without exception urged the Chicago office to have the veterinarians retained. At the camps also the Veterinary Corps has made a place for itself in connection with subsistence inspection. At some of the camps the veterinary officer is known as the food inspector and so functions, while in two of the large supply depots the entire work of subsistence inspection is carried on under the supervision of the Veterinary Corps personnel.

Concerning this work, the history of the Chicago Depot during the war contains the following: "The work performed by this force (meat inspector) was of the highest order, and a glance at the procurement tables which follow will give a general idea of the amount of work performed by this important unit. That the articles furnished were properly prepared and rigidity of inspection maintained during the course of manufacture is evidenced by the fact that less than one-half of 1 per cent of the total quantity was lost by deterioration."

In a letter to the Quartermaster General of the Army dated July 15, 1919, Brigadier General A. D. Kniskern, in charge of the Packing House Products Branch, pays this tribute to the meat-inspection service: "Such comprehensive knowledge, judgment and care was used in training and directing the rapidly increasing force of meat inspectors and in the conduct of these inspections that hundreds of millions of pounds of meats were passed by them as complying with Army specifications and there was no complaint as to quality and condition."

Dr. J. I. Gibson, formerly State Veterinarian of Iowa, and Mrs. Gibson, now residing at Bloomington, Ill., announce the marriage of their daughter Maurine on February 4, to A. W. Mason, of Bloomington, Ill. Mrs. Mason, like her father, is a talented musician, and her wonderful singing has been enjoyed on numerous occasions by different veterinary associations, whose members join in wishing for them a long and happy life. After a honeymoon trip in the Southland, they will reside in Kansas City, Mo.

DURATION OF IMMUNITY AGAINST HOG CHOLERA FOLLOWING SIMULTANEOUS INOCULATION OF YOUNG PIGS

By W. B. NILES and J. H. RIETZ

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A NUMBER of investigators and observers have stated that in a large percentage of cases the simultaneous inoculation of young pigs does not confer a lasting immunity against hog cholera. The minimum age at which simultaneous inoculation can be successfully carried out with assurance of conferring a lasting immunity has been variously placed from weaning time up to 50 or 60 pounds in weight. In an endeavor to cast additional light on this subject, the following series of experiments was carried out:

EXPERIMENT No. 1

A nonimmune sow, No. 7941, weighing 200 pounds, farrowed 10 pigs on August 31, 1917. On September 7, 1917, the 10 pigs, then being 7 days old, were simultaneously inoculated, each pig received 10 c.c. of anti-hog-cholera serum and $\frac{1}{2}$ c.c. of hog-cholera virus. On the same date the sow was given 60 c.c. of serum and 2 c.c. of virus.

The sow and pigs apparently suffered no ill effects from the treatment, but on account of the small size of sow and the large number of pigs 6 of the pigs became runty and finally died. Postmortem revealed only a large number of worms (*Ascaris*) and emaciation.

On February 9, 1918, 5 months after immunization, the 4 surviving pigs were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

EXPERIMENT No. 2

Two nonimmune sows, Nos. 833 and 834, weighing approximately 300 pounds each, farrowed 16 pigs, one litter October 7, 1917, and the other October 9, 1917. On October 15, 1917, the 16 pigs, then being 6 and 8 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus. On the same date each sow received 60 c.c. of serum and 2 c.c. of virus.

Three of the pigs became runty and died. Postmortem showed emaciation and a large number of worms (*Ascaris*). On January 15, 1918, 5 months and 1 week after immunization, the remaining 13

pigs, now averaging 75 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

The small size of these pigs at the time of exposure to hog cholera was due to cold weather and infestation with worms (*Ascaris*).

EXPERIMENT No. 3

A nonimmune sow, No. 349, weighing approximately 325 pounds, farrowed 7 pigs on June 5, 1918. One pig was dead June 8, 1918. On June 12, 1918, the remaining 6 pigs, then being 7 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus. The sow on the same date was given 80 c.c. of serum and 2 c.c. of virus. On March 31, 1919, 9 months and 26 days after inoculation, the 6 pigs, now averaging 275 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

EXPERIMENT No. 4

An immune sow, No. 0, farrowed 6 pigs on July 1, 1918. The following day 1 pig was dead. On July 8, 1918, the remaining 5 pigs, then being 7 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus. On the day of inoculation one of the pigs was suffering from an infection of the foot, which showed evidence of having become systemic in character.

On July 25, 1919, 17 days after immunization, the pig with the infected foot died. Postmortem showed cervical glands hemorrhagic, lungs hemorrhagic, spleen normal, kidneys petechial, bladder normal, cecum and colon normal.

The 4 surviving pigs continued well, and on March 31, 1919, 8 months and 23 days after immunization, the 4 pigs, now averaging 220 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus.

On April 9, 1919, one of these pigs, which will be designated B, became indisposed, showed a temperature of 105° F., continued to go about with the other hogs but refused feed, and was found dead on the morning of April 12, 1919. Postmortem showed cervical and inguinal glands congested, but no hemorrhages; lungs normal; spleen engorged; kidneys, few hemorrhages; bladder black; large and small intestines very dark, with extensive enteritis. In order to determine the presence or absence of hog cholera a piece of muscle weighing $1\frac{1}{2}$ pounds was cut from the center of one ham

and fed to pig No. 121 on April 12, 1919. The latter pig remained well for a period of three weeks, and was then exposed to hog cholera by injecting with 5 c.c. of virus on May 5, 1919. The pig showed the usual high temperature, was off feed, etc., and died May 20, 1919. Postmortem showed extensive hemorrhagic lesions of hog cholera.

Pig No. 121 having remained well following the feeding of the ham muscle from pig B, and later being proved susceptible to hog cholera by virus injection, would eliminate hog cholera as the cause of death of pig B.

With the exception of pig B, all pigs of this lot remained well following the virus injection.

EXPERIMENT No. 5

An immune sow, No. 00, farrowed 7 pigs on July 24, 1918. One pig died at time of farrowing, and there were 2 runts, which died the following day.

On August 1, 1918, the remaining 4 pigs, then being 8 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus. On March 31, 1919, 8 months after immunization, the 4 pigs, now averaging 225 pounds in weight, were each given 5 c.c. of hog-cholera virus to test immunity.

On April 4, 1919, one of the 4 pigs, which will be designated C, remained in the nest, showed temperature of 105° F., continued off feed, with high temperature, and died April 16, 1919. Postmortem showed congested cervical glands, purulent pneumonia, heart hemorrhagic, spleen enlarged, cecum and colon affected with characteristic necrotic enteritis, bladder very hemorrhagic, kidneys three times normal size, very soft, sponge-like, and small intestines hemorrhagic.

In order to determine the presence or absence of hog cholera in pig C, on the day preceding the death of this hog (April 15, 1919) 5 c.c. of blood was drawn and injected into pig No. 122. This pig remained normal for a period of 7 days (to April 22, 1919) when it showed a temperature of 107.4 and was off feed. Pig 122 continued off feed, with high temperature, for a period of 5 days, when improvement began, temperature dropped to almost normal and appetite improved. The pig was recorded as normal on May 26, 1919. Excepting poor flesh, this pig showed evidence of being normal much before being actually so recorded.

On May 27, 1919, pig 122 was exposed to hog cholera by injecting with 5 c.c. of virus. This was followed in the usual time with high

temperature, loss of appetite, conjunctivitis, weakness and diarrhea, death taking place June 9, 1919. Postmortem showed characteristic hemorrhagic lesions of hog cholera.

The susceptibility of pig No. 122 to hog cholera, which was proved by virus injection, eliminates hog cholera as the cause of illness in pig No. 122 following the injection of the blood from pig C, or of the death of pig C.

With the exception of pig C, all pigs remained well following the virus injection.

EXPERIMENT No. 6

An immune sow, No. 000, farrowed 7 pigs on August 19, 1918. On August 20, 1918, 2 pigs were found dead. On September 4, 1918, the remaining 5 pigs, then being 15 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus. On March 31, 1919, 6 months and 27 days after immunization, the 5 pigs, now averaging 215 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All 5 pigs remained well following the virus injection.

EXPERIMENT No. 7

An immune sow, X, farrowed 3 pigs on November 1, 1918. On November 8, 1918, the 3 pigs, then being 7 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus.

On May, 1919, 7 months and 12 days after immunization, the 3 pigs, now averaging 215 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

EXPERIMENT No. 8

Five immune sows farrowed 26 pigs between the evening of November 12 and the morning of November 14, 1918. On November 21, 1918, the 26 pigs, then being 7 to 9 days old, were simultaneously immunized, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus.

On January 18, 1919, one of the pigs died. The postmortem showed a large number of worms (*Ascaris*). On May 20, 1919, 7 months after immunization, the 25 remaining pigs, now averaging 215 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

EXPERIMENT No. 9

An immune sow, XX, farrowed 7 pigs on December 26, 1918. On January 2, 1919, the 7 pigs, then being 7 days old, were simultaneously inoculated, each pig receiving 10 c.c. of serum and $\frac{1}{2}$ c.c. of virus.

On June 30, 1919, 6 months and 4 days after immunization, the 7 pigs, now averaging 140 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus.

On the morning of July 7, 1919, all 7 pigs in this lot had the appearance of having been worried, possibly by dogs, and all refused to eat, but by evening all were normal and were eating excepting one. This pig refused to eat, was still, and was found dead on the morning of July 9, 1919. Postmortem showed a large amount of blood extravasated into the tissues, about the neck and throat; cervical glands dark; lungs normal; spleen normal; kidneys, few dark spots; cecum and colon, walls thickened, and mucous surface had the appearance of beginning necrosis; bladder normal; stomach normal; serous surface of small intestines showed many small hemorrhages. The blood from this pig was not tested for hog cholera, but a diagnosis of cholera could not be made from the postmortem. The surviving 6 pigs of this lot remained well following the virus injection.

EXPERIMENT No. 10

Sixty-four pigs farrowed by immune sows on farm of Mr. D. were simultaneously inoculated July 9, 1918, the pigs then being 3 to 6 weeks of age, and weights ranging from 10 to 25 pounds. The dosage ranged from 15 c.c. of serum for the smaller to 20 c.c. for the larger pigs, each pig receiving $\frac{1}{2}$ c.c. of virus.

On September 22, 1918, one of the pigs was found dead; history of recent castration.

On December 23, 1918, five and one-half months after immunization, 6 of these pigs, now averaging 100 pounds in weight, were transferred to the Bureau Station and exposed to hog cholera by injecting each with 5 c.c. of virus. Following this exposure all pigs remained normal.

On January 11, 1919, 6 months after immunization, the remaining 57 pigs, now averaging 110 pounds in weight, were exposed to hog cholera, on Mr. D.'s farm, by injecting each with 2 c.c. of hog-cholera virus. All pigs remained well following the virus injection.

EXPERIMENT No. 11

Forty-one pigs farrowed by nonimmune sows on the farm of Mr. H. were simultaneously inoculated July 20, 1918. Each pig received 20 c.c. of serum and $\frac{3}{4}$ c.c. of virus. The mothers of these pigs were also simultaneously inoculated on the same date, each receiving 60 c.c. of serum and 2 c.c. of virus. The pigs ranged in weight from 10 to 20 pounds and were from 3 to 5 weeks of age at the time of inoculation.

Two pigs of this lot died and one pig was sold during the interval between the time of inoculation and exposure to hog cholera.

On February 20, 1919, 7 months after immunization, the 38 pigs, now averaging 120 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

EXPERIMENT No. 12

Six pigs farrowed by a nonimmune sow on the farm of Mr. C. were simultaneously inoculated July 20, 1918. Each pig received 20 c.c. of serum and $\frac{3}{4}$ c.c. of virus. The mother of these pigs was simultaneously inoculated on the same date, receiving 60 c.c. of serum and 2 c.c. of virus. The weights of these 6 pigs ranged from 10 to 15 pounds and the pigs were about 4 weeks old at time of inoculation. On January 27, 1919, 6 months and 1 week after inoculation, the 6 pigs, now averaging 125 pounds in weight, were exposed to hog cholera by injecting each with 5 c.c. of virus. All pigs remained well following the virus injection.

SUMMARY AND CONCLUSIONS

All pigs used in the first 9 experiments were farrowed on the Bureau Station grounds at Ames, Iowa, and during the interval between farrowing and exposure were held in small pastures on that part of the premises, as far from the buildings and experimental pens as possible. Drainage was, for the most part, away from the pasture; the feeder and caretaker did not work with virus, about cholera pigs, or the buildings where virus is handled. Every precaution was taken to prevent exposure of the pigs to cholera before the proper interval had elapsed between immunization and exposure to virus.

In the last 3 experiments, carried out on farms in the vicinity of Ames, Iowa, the pigs had the usual range of pastures, hog lots and sheds found on the farms. Hog cholera did not exist on any farms

in the community, consequently we believe no exposure occurred between the time of immunization and the time of exposure by virus injection.

There were no apparent ill effects from the simultaneous inoculation in any of the pigs or the nonimmune sows used in the foregoing experiments.

The serum was injected in equal amounts into the two inguinal and axillary spaces of each pig, the virus being injected into the ham.

The 171 pigs inoculated on the station premises and on farms when 7 days to 6 weeks old, and exposed to hog cholera 5 months to 9 months and 26 days later, were found without exception to be immune to hog cholera. Three pigs of this number, however, died during the period of exposure from causes other than cholera.

There was no difference in the immunity in pigs from immune and nonimmune sows.

These experiments, although few in number, indicate that the simultaneous inoculation of young pigs confers a lasting immunity.

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Dr. H. L. Darby, who is the veterinary adviser for the firm of Sherwin-Williams Co., has just returned from a six months' trip through Brazil, Uruguay and Argentina, where he made a study of the markets for dips, disinfectants and insecticides for plants. He called on the principal veterinary officials of the countries visited, and a lively interest was manifested by them in the veterinary activities of the United States. Dr. Darby is planning to leave about May 1 on another extended trip, embracing the West Indies, Central America, Venezuela and Colombia, in the interest of his company.

Dr. and Mrs. A. G. Alverson, of Bloomington, Ill., are spending the winter in California.

STUDIES ON ANTHELMINTICS

VIII—Some Experiments with Fluid Extracts

By MAURICE C. HALL

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IN a previous paper (Hall, 1918) the writer has made the following statements in regard to fluid extracts as anthelmintics:

"Fluid extracts or other preparations using alcohol as a solvent for active anthelmintic ingredients are frequently unsuitable as anthelmintics.

"Experiments in this laboratory on a number of such preparations indicate that there are good objections to some of these preparations. In the first place, the very fact that alcoholic preparations are adapted to the production of rapid systemic effect—the effects one wishes to avoid in using the characteristically toxic group of drugs known as anthelmintics—is one reason why they are unsuitable as anthelmintics. These alcoholic preparations are often rapidly absorbed, largely in the stomach and duodenum, occasioning more or less irritation at the point of absorption and producing systemic effects of a more or less toxic nature. The considerable and rapid absorption leaves a comparatively small amount of drug available for actual anthelmintic action, and by the same token leaves the minimum of drug that could possibly be removed by purgation after exerting its anthelmintic effect. In the writer's opinion, some alcoholic preparations of anthelmintics are distinctly dangerous to the host animal and relatively ineffective against parasites, and this opinion is substantiated by quite a number of experiments in this laboratory."

The object of this paper is to detail some of these experiments on fluid extracts as anthelmintics.

The fluid extracts tested were those of kamala, chenopodium, balsam poplar buds (balm of Gilead), caulophyllum (blue cohosh), and spigelia (pink root).

Kamala in powder form is well known as a very satisfactory tæniafuge and is one of the two remedies used in removing the common liver fluke from sheep. Tests of the fluid extract were made with 3 dogs as follows:

¹Resigned March 27, 1919.

Dog No.	Weight	Dose	In Water	WORMS PASSED				WORMS POSTMORTEM				Digestive Tract
				Ascaris	Hookworms	Whipworms	Tapeworms	Ascaris	Hookworms	Whipworms	Tapeworms	
24	Kilos	Mils	Mils	1	0	0	2	0	2	2	2	Normal
48	7.5	8	24	0	0	0	0	0	1	0	37	Normal
206	11	8	24	0	0	0	0	2	0	0	10	Gastric hemorrhage
	9	16	None	0	0	0	0					

The treatment removed 1 of 3 ascarids (33 per cent), none of 3 hookworms (0 per cent), none of 2 whipworms (0 per cent), and 2 of 49 tapeworms (4 per cent). This result is sufficiently inferior to the results we can depend on attaining with other drugs to warrant the belief that this preparation can not be regarded as a valuable anthelmintic.

In small doses (8 mils) the drug was uninjurious to the digestive tract, but in larger dose (16 mils) postmortem examination showed hemorrhages in the stomach.

Chenopodium in the form of oil of chenopodium is the most valuable all-around anthelmintic that we know of, being the best for use in single-dose treatment against ascarids and giving better results in three doses at hour intervals for removal of hookworms than thymol in therapeutic dose gives. Tests of the fluid extract were made with 3 dogs as follows:

Dog No.	Weight	Dose	In Water	WORMS PASSED				WORMS POSTMORTEM				Digestive Tract
				Ascaris	Hookworms	Whipworms	Tapeworms	Ascaris	Hookworms	Whipworms	Tapeworms	
55	Kilos	Mils	12 mils	1	0	0	0	3	0	33	80	Inflamed
	18	4	01. ric.									
			30 mils									
56	14	4	12 mils	0	0	0	0	22	1	0	19	Inflamed
			01. ric.									
			30 mils									
59	4	2	6 mils	0	0	0	0	1	1	1	0	Gastric hemorrhage
			01. ric.									
			20 mils									

The treatment removed 1 ascarid out of 27 (4 per cent) and none out of 2 hookworms, 34 whipworms, and 99 tapeworms (0 per cent). In view of the high anthelmintic efficacy of oil of chenopodium, there would appear to be no reason for using a fluid extract which shows so little efficacy as an anthelmintic.

In all cases the digestive tract was inflamed or showed gastric hemorrhage, as would be expected from the fluid extract of chenopodium, since we know that the oil of chenopodium acts as a gastrointestinal irritant, and alcohol would probably increase the rate of absorption.

The fluid extract of balsam poplar buds was tested as follows:

Dog No.	Weight	Dose	In Water	WORMS PASSED				WORMS POSTMORTEM				Digestive Tract
				Ascaris	Hookworms	Whipworms	Tapeworms	Ascaris	Hookworms	Whipworms	Tapeworms	
174	Kilos 13.5	Mils 4	30 mils	0	0	0	0	0	0	0	0	Normal
179	12	4	None	0	0	0	0	10	0	8	0	Normal
176	11.5	10	None	55 or 18	0	0	0	0	0	0	0	Normal

Dog No. 176 and another dog in a different experiment escaped from their cages on one occasion, making it impossible to say which one passed a number of worms that were found outside of the cages, hence the two figures given for ascarids passed. However, the experiment shows that in doses of 10 mils, undiluted, the fluid extract of balsam poplar buds is 100 per cent effective against ascarids, whereas in doses of 4 mils, undiluted, it is 0 per cent effective against ascarids.

The digestive tracts were normal in all 3 dogs. It should be said in comment that the fluid extract of balsam poplar buds contains a large amount of difficultly soluble material, oleoresins and resins, which material is promptly thrown out of solution on the addition of a small amount of water or on contact with the buccal mucosa. This comparative insolubility probably accounts for the fact that the drug causes no injury to the digestive tract and also for the necessity for large doses.

The following tests were complicated in a way that makes tabulation unsatisfactory, so they are given in detail.

Dog No. #05, weighing 7.5 kilos, was given 7.5 mils of fluid extract of spigelia and senna in 15 mils of water. The next day the dog passed 1 ascarid. No more worms were passed until the fourteenth day, when 5 ascarids were passed. While the passage of these worms at this late date might be partly due to toxic effects of the anthelmintic, which weakened the worms in the first instance,

the connection is too uncertain and too tenuous. Ordinarily our experiment animals are killed on the fourth day, as our findings (Hall, 1918) show that about 98 per cent of the worms passed by dogs after an anthelmintic come away in the first 4 days after treatment, the remaining 2 per cent coming away on the fifth to the seventh day. It is undeniable that an anthelmintic might weaken a worm to the point where it would succumb to unfavorable conditions 2 weeks later, but such action must be disregarded in a consideration of anthelmintics. To merit consideration as an anthelmintic in experiments on dogs, a drug must furnish of itself such unfavorable effects on worms as to bring them away within a week, and the big majority of worms, in fact, actually do come away from dogs within the first 24 hours after the administration of the anthelmintic. In the case of dog No. 105, the animal had 45 ascarids and 10 *Dipylidium* postmortem, showing an efficacy of 2 per cent against ascarids and 0 per cent against *Dipylidium*. The digestive tract showed a moderate degree of inflammation.

Dog No. 170, weighing 4.5 kilos, was given 1 mil of fluid extract of caulophyllum (blue cohosh) in 3 mils of water. During the next 5 days the dog passed 5 ascarids. On the fifth day the dog was given 4 mils of fluid extract of balsam poplar buds in 12 mils of water. The dog was dead the next morning. Postmortem examination showed 64 ascarids in the large intestine and cecum. These must be credited to the anthelmintic action of the balsam poplar buds, and the number would presumably have been greater if the dog had not died too soon after treatment to permit the anthelmintic to display its total efficacy. However, this dog still had in the small intestine 1,985 ascarids, most of them very young worms, and 1 hookworm. There was some inflammation and hemorrhage in the digestive tract. The early death of the dog and the other complications here make it difficult to draw conclusions.

SUMMARY

The low tæniacidal value of fluid extract of kamala as compared with the high tæniacidal value of powdered kamala, and the low ascaricidal value of fluid extract of chenopodium as compared with the high ascaricidal value of oil of chenopodium, bear out the statement that fluid extracts are frequently unsuitable as anthelmintics. Fluid extract of spigelia and senna promises little of value as an anthelmintic, and this is in agreement with Foster's findings, published by Hall and Foster (1918). Fluid extract of balsam poplar

buds may prove to be effective against ascarids, and uninjurious, when taken in large doses, but large doses of this drug, with the precipitation of the resinous content on the buccal mucosa, are resented by dogs and would not be very attractive to man. Fluid extract of caulophyllum did not receive sufficient test to draw conclusions on, but in the dose used it was not very effective.

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HALL, MAURICE C. 1918. A discussion of some principles of anthelmintic medication. *N. Orleans M. & Surg. J.*, v. 70 (8), Feb., pp. 637-653.

HALL, MAURICE C., & WINTHROP D. FOSTER. 1918. Efficacy of some anthelmintics. *J. Agric. Research*, v. 12 (7), Feb. 18, pp. 397-447.

AN appropriation has been made by Congress to enable Dr. E. W. Nelson, Chief of the Biological Survey, Department of Agriculture, to build up the reindeer industry in Alaska. A chief veterinarian trained in animal husbandry is needed to take charge of the investigation of diseases and parasites among reindeer and developing methods of combating them, as well as to supervise experiments for grading up the reindeer herd in order to increase the quality and meat production of these animals. There are now 160,000 reindeer in Alaska and it is estimated by reindeer owners that the coming calf crop this spring will increase the number to 200,000. This industry in Alaska has great future possibilities and the veterinarian in charge of the work will have a large field to develop and an opportunity to perform a valuable service in developing the resources of Alaska, as well as materially adding to the meat supply of the Nation. It has been estimated that the grazing capacity of Alaska will maintain more than ten million reindeer. This is an interesting field for an ambitious and competent young man under 40 years of age, with energy and initiative. The position will pay up to \$3,000 a year to begin with and subsistence and other traveling expenses when away from the official station.

Dr. H. Jensen, of the Jensen-Salsbery Co., Kansas City, Mo., was a recent visitor to Washington, D. C., during the Easter season, renewing old friendships and looking for the latest ideas along biological and pharmaceutical lines.

ABSTRACTS

FOOT-AND-MOUTH DISEASE: TRANSMISSIBILITY TO MAN. Di Pace. Policlinico, Aug. 31, 1919. Abstract in American Medicine, Feb., 1920.

THE author cites evidence from various countries to show that the aphthous fever of cattle can be transmitted to man, but that contagion occurs comparatively rarely. Milk from infected animals is the source of the greatest danger. A trace of fluid from one of the vesicles is enough to contaminate a large amount of milk; one cow with the disease can infect the milk from the whole dairy. But there is no evidence that the virus invades the muscle tissue, and there need be no fear of harm in eating the meat, provided the animal is slaughtered and eviscerated at once and the meat is well cooked. Unless these two conditions can be fulfilled the meat should not be used, as toxins resistant to heat may spread to the muscle tissue under other conditions. He quotes Prof. Mazzine to the effect that the soldiers in the Turin district have been fed on meat from cattle with epizootic aphthæ, and that he used it in his own family without the slightest disturbance therefrom.

THE EFFICACY OF NORMAL SERUMS IN ANTHRAX INFECTION. Hutyra and Manninger. Centbl. Bakt. etc., I Abt. Orig. Bd. 83, Hft. 7, p. 518-519.

In experiments conducted by the authors, sera from normal horse, cattle and sheep failed to protect young rabbits against subcutaneous injections of virulent anthrax culture. Control animals receiving immune sera from horse and cow withstood the anthrax infection. The fact that occasionally normal sera have protective and curative action is explained on the ground that such sera come from animals which have previously been subjected to one or more light natural infections. It is known that animals while at pasture on infected meadows take up with the grass and drinking water large quantities of anthrax spores without manifesting any visible symptoms of sickness. Such latent infections can, nevertheless, cause the formation of antibodies leading to a certain degree of immunity of the affected animal.

The authors, who performed their experiments in Europe, suggest that in more badly infected regions, such as Argentina, the above phenomenon should occur more frequently. L. T. GILTNER.

GENERALIZED CANCER OF THE PANCREAS IN A HORSE, WITH PERFORATION OF THE STOMACH. Veterinarian Quentin. *Rec. Méd. Vét.*, vol. 95, pp. 290-296, 1919.

The extreme rarity of cancer of the pancreas in the horse (contrary to its comparatively frequent occurrence in man), the curious stomach lesions and the peculiar clinical course of this case have led to its description.

Clinical examination—A fifteen-year-old gelding was brought in to be treated for colic. The animal had voided a large quantity of blood from the mouth and nose; blood was red, aerated. Head was held down, pawing and striking the ground with his forelimbs, rolled about several times with violence, and finally there was complete lateral decubitus. The end of the patient seemed near. Temperature reached 40.3 (104 F.). Conjunctiva pale. Pulse imperceptible; extremities cold. Animal refused to get up.

Injected 20 centigrams (0.02 gram) morphin hydrochlorid and applied refrigeration to the thorax. Fifteen minutes later the animal got up unassisted; gait, normal. Remained standing for $\frac{3}{4}$ hour without outward signs of pain or hemorrhage. Then, inside of a few minutes, violent colic developed. He threw himself from side to side with remarkable speed, sometimes he remained on his back, his legs violently kicking the air. He rose suddenly and tried to support himself in a corner of his stall; forelimbs were under the trunk. He looked at and tried to bite the anterior face of the sternum. No tympany. Frequently the sitting position was taken; sitting on his haunches like a dog.

Indigestion and intestinal obstructions are easily eliminated; it is impossible, however, to locate a lesion definitely. Two days after arrival, the animal is apathetic, inferior face of sternum traumatized due to frequent bites; no tympany. Pressure on the 8th, 9th and 10th intercostal spaces at the union of the median and superior thirds of the chest caused marked pain and defensive reactions. Toward evening the dejection of the animal increased; kept eyes closed, was insensible to external stimuli; skin and extremities cold. Pulse, small, arhythmic, 90. Temperature, 38.8. Death followed.

Autopsy: Cadaver not bloated. Most striking find was: Pancreas was replaced by an enormous cancerous mass, adhesions to stomach on right side; stomach perforated.

(Note by Abstractor.—The author's inability to locate definitely the lesion after most painstaking examination is easily understood, first, because of the rarity of the disease, and second, lack of litera-

ture on the subject. Hutyra and Marek's Pathology and Therapeutics of the Diseases of Domestic Animals contains not quite three pages on diseases of the pancreas!) W. N. BERG.

TREMbles IN SHEEP. M. L. Bigoteau. Rev. Gén. Méd. Vét., Aug. 15, 1919, p. 433.

The author believes that this disease is one of the various manifestations of infection with the bacillus of Preisz-Nocard, basing his convictions on long observations which showed that trembles is always encountered in infected bands. It disappears from bands when there is rigid prophylaxis against infection by the Preisz-Nocard bacillus.

Observations on two cases are reported. In a band of ewes trembles made its appearance. Some years before Preisz-Nocard infection was diagnosed. The disease affected animals of the same lambing, aged two to three years. It develops slowly. Autopsies on sick animals that were slaughtered showed in every case lesions caused by the Preisz-Nocard bacillus. The disease was introduced by males from another band.

In another band of well conditioned sheep but in which Preisz-Nocard infection was present, trembles appeared. As in the preceding case the disease affected only animals of the same lambing, aged from 20 to 25 months. Autopsies revealed caseous lesions in some of the tissues. For the introduction of the disease into this band the males were also incriminated. L. T. GILTNER.

Dr. S. L. Stewart formerly of the Kansas City Veterinary College and for the past two years Professor of Anatomy in the Chicago Veterinary College, will locate in Champaign, Illinois, for practice about April 1st.

Mr. B. D. McCabe, an old and trusted employe of the Bureau of Animal Industry, for a number of years assigned as agent in scabies eradication under the supervision of Dr. F. E. Murray, Salt Lake City, Utah, died March 2. Mr. McCabe was the father of George P. McCabe, who was Solicitor of the Department of Agriculture from 1905 to 1913.

Dr. Bert J. Cady, B. A. I. Inspector, is in charge of hog cholera control work in the State of New York with headquarters at Ithaca, N. Y.

ARMY VETERINARY SERVICE

NEWS FROM THE SURGEON GENERAL'S OFFICE

THE following orders of transfer and reassignment have been issued for veterinary officers:

1. Major A. Mitchell, V. C., from Camp Funston Remount Depot, Kan., to Louisville, Ky., for duty as Purchasing Zone Veterinarian for Eastern Purchasing Zone for public animals.

2. Major Charles H. Jewell, V. C., from duty in the Veterinary Division, Surgeon General's Office, Washington, D. C., to Fort Riley, Kan., for duty as Post Veterinarian and as Officer in Charge of Veterinary Instruction in the Cavalry School, Fort Riley.

3. Major B. A. Seeley, V. C., from Remount Depot, Camp Meade, Md., to Chicago, Ill., for instruction in meat inspection.

1. Captain J. W. Crouse, V. C., from Chicago, Ill., to Remount Depot, Camp Pike, Ark., for duty as The Veterinarian.

2. Captain K. F. Hinckley, V. C., from Chicago, Ill., to Fort Myer, Va., for duty as Post Veterinarian.

3. Captain H. S. Eakins, V. C., from Veterinary Division, Surgeon General's Office, Washington, D. C., to Chicago, Ill., for duty.

4. Captain C. L. Miller, V. C., from 4th Division, Camp Dodge, Iowa, to Camp Funston, Kan., for duty as The Veterinarian, R. D., that Camp.

5. Captain H. Clarke, V. C., from duty in the Veterinary Division, S. G. O., Washington, D. C., to Fort Jay, N. Y., for duty as Post Veterinarian.

6. Captain William H. Dean, V. C., from Fort Jay, N. Y., to Camp Jackson, S. C., for duty as Camp Veterinarian.

7. Captain C. M. Gilchrist, V. C., from duty with 1st Division, Camp Taylor, Ky., to Remount Depot, Camp Taylor, Ky., for duty as The Veterinarian.

8. Captain W. A. Sproule, V. C., from Remount Depot, Camp Taylor, Ky., to 1st Division, Camp Taylor, Ky., for duty as Division and Camp Veterinarian and Veterinarian Instructor in the Field Artillery Basic School, that Camp.

9. Captain J. R. Mahaffy, V. C., from Remount Depot, Fort Bliss, Texas, to Chicago, Ill., for instruction in meat inspection.

10. Captain F. B. Gage, V. C., from Camp Lewis, Wash., to Chicago, Ill., for instruction in meat inspection.

11. Captain C. S. Parker, V. C., from 4th Division, Camp Dodge, Iowa, to Chicago, Ill., for instruction in meat inspection.

1. 1st Lieut. J. G. Catlett, V. C., from Remount Depot, Fort Keogh, Mont., to Louisville, Ky., for duty with the Eastern Purchasing Zone Officer for public animals.

2. 1st Lieut. G. L. Caldwell, V. C., from Chicago, Ill., to Honolulu, Hawaiian Islands, for duty.

3. 1st Lieut. E. L. Jarvis, V. C., from Front Royal, Va., to Louisville, Ky., for duty with the Eastern Purchasing Zone Officer for public animals.

4. 1st Lieut. R. M. Buffington, V. C., from 1st Division, Camp Taylor, Ky., to Chicago, Ill., for instruction in meat inspection.

5. 1st Lieut. F. B. Croll, V. C., from Kansas City, Mo., to Fort Bliss, Texas, for duty at Remount Depot, that Post.

6. 1st Lieut. A. H. Chamberlin, V. C., from Remount Depot, Camp Travis, Texas, to 4th Division, Camp Dodge, Ia., for duty.

7. 1st Lieut. C. L. Nelson, V. C., from Remount Depot, Camp Travis, Tex., to 4th Division, Camp Dodge, Iowa, for duty.

8. 1st Lieut. J. W. Graham, V. C., from Remount Depot, Camp Meade, Md., to Remount Depot, Camp Lee, Va., for duty.

9. 1st Lieut. J. P. Gerety, V. C., from Remount Depot, Camp Lee, Va., to Fort Clark, Texas, for duty as Assistant to the Post Veterinarian.

1. 2nd Lieut. O. W. Anderson, V. C., from Camp Sherman, Ohio, to Fort Monroe, Va., for duty as Post Veterinarian.

2. 2nd Lieut. J. W. Timmons, Jr., V. C., recently arrived in this country from Coblenz, Germany, to Chicago, Ill., for instruction in meat inspection.

DIRECTOR OF VETERINARY CORPS AWARDED DISTINGUISHED SERVICE MEDAL

BY direction of the President, under the provisions of the Act of Congress approved July 9, 1918, a Distinguished Service Medal has been awarded Col. Charles F. Morse, Director of Veterinary Corps for exceptionally meritorious and distinguished service based on the following citation:

"As Director of the Veterinary Corps, by displaying exceptional energy, zeal, and good judgment he organized and administered with marked success a veterinary service capable of meeting every need in home territory and in the theatre of operations. He provided effective means for the treatment of sick and wounded animals, for the prevention of disease among well animals, for the inspection of meat and dairy products used by the Army, and through the establishment of schools of instruction placed the personnel of the Veterinary Corps of the Army on a high plane of efficiency."

The Surgeon General in recommending this award states:

"This officer was largely instrumental in building up a veterinary service during the war from practically nothing to 2,130 officers and 20,000 enlisted men and upon him devolved the care and treatment of the sick and wounded arising among 465,000 animals. Aside from the obligations to be met in home territory he was responsible for the organization and dispatch overseas of all veterinary personnel and material required there. Believing that suitable recognition

should be accorded the officer in home territory who not only made the overseas achievements possible but also successfully overcame a task of great magnitude here, and as final evidence of appreciation of the splendid services rendered by the veterinary profession of America during the World War, I recommend that this paper be given earnest and favorable consideration."

It is impossible for the undersigned to express adequate appreciation of the great honor conferred by this award. What seems of far greater importance than any personal consideration is the high compliment thereby paid the personnel of the Veterinary Corps and the veterinary profession of America. While I may have played a humble part in placing "the personnel of the Veterinary Corps of the Army on a high plane of efficiency," no one knows better than I how essential to the attainment of this object have been the whole-hearted enthusiasm, the faithful attention to duty and the intelligent, well directed efforts on the part of my colleagues in this office and of the veterinary officers of the Army at large which have been constantly in evidence. No one realizes more acutely the discouragements encountered and the obstacles overcome both in this country and in France by officers of the Veterinary Corps through the exhibition of these qualities. The sacrifices made by the civilian veterinarians were equal to those made by men in other walks of professional life and are deserving of the same high commendation. Our enlisted men as a body were of splendid type and while not veterinarians themselves rendered services of vital importance to success. If the patients with whom they labored faithfully could but speak, no other praise would be needed.

No one man made the Veterinary Corps any more than one man can hold it up to its high standard. Each individual participating in this achievement is deserving of credit for his share and it should be a matter of lasting pride to him that the result has been deemed worthy of official recognition. It is with the utmost satisfaction that I avail myself of this opportunity to congratulate every man of the veterinary service on having had the privilege of writing his few lines in that magnificent chapter of the history of the veterinary profession of America, the Army veterinary service of the World War.

C. F. MORSE,
Colonel, Medical Corps,
Director, Veterinary Corps.

ARMY REORGANIZATION

THE Army Reorganization Bill was recently passed by the House of Representatives. There was no material change made in the text of the bill on the floor of the House as it was considered section by section.

The Medical Department, section 10 was considered and agreed to without any comment as regards the Veterinary Corps. This section provides "The Veterinary Corps shall consist of 140 officers in grades from colonel to second lieutenant, inclusive." The Army as authorized by this bill will consist of 299,000 enlisted men and about 17,720 officers. For an army of this size with its organizations of infantry, cavalry, field artillery, machine guns, etc., it will require a minimum of 347 officers to do the work necessary for a veterinary service as now organized in the Medical Department and not less than 2,500 enlisted men.

The Senate having disposed of the peace treaty has now passed the reorganization bill reported by the Senate military committee. This measure was passed on April 20 as a substitute measure for the bill considered by the House. In the Senate Army Bill provision is made for 200 veterinary officers from grade of colonel to that of second lieutenant and 1,500 enlisted men.

It is hoped that when these two bills are sent to conference where the army reorganization measure will be drafted that will define the military policy of the country for the immediate future the veterinary profession will be able to impress upon the conferees the necessity of providing adequate veterinary service to take care of the army animals and meat and dairy inspection to the end that they will authorize not less than 200 permanent officers for the corps and at least 2,000 enlisted men.

SECOND LIEUTENANTS, R. C.

To the Editor:

I would like to voice my protest against veterinarians accepting commissions as Second Lieutenants in the Veterinary Section of the Officers' Reserve Corps.

Dentists and physicians are receiving commissions as First Lieutenants and I see no reason why the veterinarians should take the rear seat and be started at the lower step of Second Lieutenants.

Of course the claim will be advanced that it will cause considerable embarrassment when the Reserve Officers are mobilized for training each year, and a regular Army Veterinarian, ranking Second

Lieutenant, is present. Very well, his embarrassment may be just as painful if there is one First Lieutenant, R. C. Veterinary Section, as if they were all Firsts. What is the weight of that argument?

In case the Reserve Corps is mobilized for war, the regular Army Veterinarian, ranking Second Lieutenant, may be advanced several grades to take care of the matter, for the reason that he is the better trained soldier. Seniority is governed by the date of call into active service and not from date of commission. As it now stands the regular Army Veterinarian may be placed where he will be ranked by an under-trained Captain, V. S. R. C. Will the pain be less acute than if he were ranked by a First Lieutenant, V. S. R. C.? Besides if we are to be mobilized for training annually, in all probability the officers in charge of the training will be of higher rank.

It only requires a firm stand by the veterinarians to secure this recognition. If we are to make any decided stand for advancement of the profession in America, this would be a most important step in that direction.

The American Veterinary Medical Association can get this well deserved concession if we will come out flat-footed and stand pat.

Carrizozo, N. M.

CARL E. FREEMAN.

NECROLOGY

Dr. J. M. Kaylor of Barry, Ill., died February 27, 1920. Dr. Kaylor was a graduate of the Chicago Veterinary College of 1893. During the past three years he has been Assistant State Veterinarian. He has been a member of the American Veterinary Medical Association for the last few years.

B. A. I. RESIGNATIONS

During the five months ending March 15, 1920, 104 veterinarians resigned from the service of the Bureau of Animal Industry. In 17 instances the reason given was to engage in private practice. No reason was given in 36 cases. In most of the other instances, however, the reason for resignation was to enter a position with higher salary, although some veterinarians left the service on account of ill health, either of themselves or their families.

Dr. Harry E. Pinkerton, Sioux City, Iowa, in charge of virus-serum control work, after a service in the Bureau of Animal Industry of nearly fifteen years, has resigned to accept a position with the Fort Dodge Serum Company at an increased salary.

ASSOCIATION NEWS

Proceedings of the Fifty-Sixth Annual Meeting of the American Veterinary Medical Association

Held at the Hotel Grunewald, New Orleans, La.,
November 17 to 22, 1919

(Continued from the April number)

THURSDAY MORNING, NOVEMBER 20, 1919

SECTION ON SANITARY SCIENCE AND POLICE

The meeting was called to order at 9 a. m. by Dr. L. E. Day, chairman, who announced that the session would be devoted to topics of interest to Bureau of Animal Industry veterinarians.

PRESENTATION OF PAPERS

THE CHAIRMAN: The first paper on the program is one by Dr. V. A. Moore entitled "Retrospection and Fraternity from the Standpoint of a Former Employee of the Bureau of Animal Industry."

(Dr. Moore made an address which will appear in a later issue of the JOURNAL.)

THE CHAIRMAN: Gentlemen, I don't believe that this address of Dr. Moore is one that really needs any discussion, but if there are any of you that have any questions you would like to ask him, I think he would be glad to answer them. I personally feel that we owe a debt of gratitude to Dr. Moore for this splendid address he has given us, and I also want to assure Dr. Moore that we are glad to hear him say that the meat inspection of the United States is the best in the world. What has made it best? Simply because we have been following something along the lines of the suggestion that Dr. Moore has made, and that is, that every man wants to be the very best in his particular department; he doesn't want to have anybody ahead of him, and he also gives the best energy that he has to give and that is what has made the meat inspection service of the United States a service that Dr. Moore can come and tell you is the best in the world.

If there are no questions that you care to ask Dr. Moore, I will call upon the next speaker on the program, Dr. John R. Mohler, the Chief of the Bureau of Animal Industry.

DR. J. R. MOHLER: Mr. Chairman and Gentlemen, when our genial Secretary wrote me and asked me to take part in this program I decided that the subject that most needed discussion was foot-and-mouth disease, and I chose that subject for three reasons: (1) The work that the Bureau has accomplished in the eradication of this disease was one of its greatest achievements. (2) Foot-and-mouth disease has never appeared in this region of the country, and I

thought it would be interesting to the veterinarians of this section. (3) Because in the last six months there have been very extensive outbreaks of foot-and-mouth disease in South America, also in Italy, Switzerland, the southern part of France where it is epizootic, and in some other sections. I recently saw a letter from Sir Stewart Stockman of London, in which he says they were having sporadic outbreaks in England; so I felt that, now that the time is coming when the anniversary of the last three outbreaks in this country is about to occur, we should take even more interest in this disease than we have in the last three or four years.

(Dr. Mohler's paper, "Importance of Preparedness in Meeting Future Outbreaks of Foot-and-Mouth Disease," will appear in a later issue of the JOURNAL.)

THE CHAIRMAN: Gentlemen, Dr. Mohler's paper is now open for discussion if you wish to discuss it.

The next paper on the program is by Dr. T. E. Munce, on "Malignant Catarrhal Fever."

(Dr. Munce read his paper, which appeared in the JOURNAL for March, 1920.)

THE CHAIRMAN: Gentlemen, you have heard this valuable paper. It is now open for discussion.

There being no discussion, the next paper is by Dr. J. A. Kiernan, on "Tuberculosis Eradication."

(Dr. Kiernan read his paper, which will appear in a later issue of the JOURNAL.)

THE CHAIRMAN: Gentlemen, you have heard this paper by Dr. Kiernan. Are there any remarks?

DR. J. F. WINCHESTER (Lawrence, Mass.): Mr. Chairman, no one in this audience has more respect for the statements of Dr. Kiernan than I. He is right. I just want to go on record in stating that in 1887, as a Commissioner of the State of Massachusetts, in a minority report I listed the production of tuberculous animals as dangerous to man. You will find that in the agricultural report of Massachusetts for 1888. In 1908 I attended the conference at Washington of the International Congress on Tuberculosis, and I was upstairs hidden away with the crowd when they all agreed that there was a possibility of the transmissibility of tuberculosis from animal to man. I put this matter in the archives of the Association because, being hidden away in the agricultural report in the State of Massachusetts, where there is so little agriculture done in comparison to other States, they failed to pick it out. If you look up the history of TB in Massachusetts you will find the most chaotic mass of tuberculosis that you ever saw, and the last thing that stung me to death was testing a cow three times within 30 days with tuberculin test, and yet it was ordered released. (Laughter.)

THE CHAIRMAN: The next paper on the program is "Additional Observations on Tuberculin Testing," by Dr. W. H. Turner.

(Dr. Turner read his paper, showing and explaining charts. It was published in the JOURNAL for April, 1920.)

THE CHAIRMAN: Gentlemen, this excellent paper of Dr. Turner is open for discussion. Does anyone wish to discuss it?

There being no discussion, Dr. Cambon asks that I move him in front of the program. I will now call on Dr. Cambon for his paper.

(Dr. Cambon read his paper on "The Sanitary Production and Handling of Milk," which appeared in the JOURNAL for March, 1920.)

THE CHAIRMAN: Gentlemen, our next paper is by Dr. R. W. Tuck, on "Meat Inspection and Its Value as a Safeguard to Public Health."

(Dr. Tuck read his paper, which will appear in a later issue of the JOURNAL.)

ELECTION OF SECTION OFFICERS

THE CHAIRMAN: You have heard this paper and also the one preceding it. Is there any discussion? If there is no discussion, we will proceed at once to the election of the officers for the coming year and then adjourn. Who is your choice, gentlemen, for chairman of this section?

DR. TURNER: I move that Dr. Day be nominated for chairman.

(The motion was seconded.)

DR. MURPHY: I would like to move that the Secretary be authorized to cast one ballot for chairman.

(The motion was seconded and carried unanimously.)

THE SECRETARY: In accordance with the wishes of the Association, I hereby cast the unanimous ballot for L. E. Day as chairman for the ensuing year.

THE CHAIRMAN: For the office of secretary whom have you in mind?

DR. WM. HERBERT LOWE: Mr. Chairman, I take pleasure in nominating Dr. Preston Hoskins for secretary.

(The motion was seconded by Dr. Kiernan.)

DR. MURPHY: I would like to nominate Dr. C. P. Fitch of Minnesota.

(Dr. Fitch declined the nomination.)

(It was moved, seconded and carried that the nominations be closed.)

THE CHAIRMAN: I presume that that really elects Dr. Hoskins, as he was the only one.

Adjournment.

SECTION ON GENERAL PRACTICE

The meeting was called to order at 9:45 a. m. by Dr. A. S. Cooley, chairman of the section.

THE CHAIRMAN: Gentlemen, I shall detain you for only a few moments. As chairman of this section I selected a number of papers for the section, but it has been seen fit to transfer them to other sections, so that I am left with only one, and the reader of that, as well as of the others, is absent. This morning, after running up and

down stairs for about three quarters of an hour, I found that this condition existed.

The first paper that was selected was one to be read by Dr. H. A. Trippeer of Walla Walla, Wash., but as stated before he is absent. The next one is a paper by Dr. L. C. Kigin of Lafayette, Ind., but he is also absent. Dr. Turner and Dr. Munce, who were to have read papers, have been transferred to the Section on Sanitary Science and Police. Dr. Goldberg of Ithaca, N. Y., was to have given us some illustrations on "The Occurrence of Epithelial Tumors in Domesticated Animals."

(Dr. Trippeer's paper on "Impaction in the Horse" appeared in the JOURNAL for February, 1920. Dr. Kigin's paper appears in this issue.)

THE CHAIRMAN: We were transferred from the other room to this, and I find that the men have been transferred from this to the other section, so that I do not feel like holding you in this section when you can go up and hear what they have to say in the other. But I do feel that I want some men to get something in this section worth while in Ohio next year, and I have talked the matter over with several of them as to the selection of a chairman and a secretary of this section, and their desires were made known to me. Their selections were Col. H. E. Bemis of Ames, Iowa, as chairman and Col. L. A. Merillat as secretary of this section at our next session in Ohio next year. If any of you gentlemen will nominate the gentlemen just named, we will go ahead and have this business meeting and then adjourn. Are there any nominations to be put before the house for chairman for our next session? The name of Dr. H. E. Bemis has been proposed.

(On motion, seconded, Col. Bemis was unanimously elected chairman of the section for the next meeting.)

THE CHAIRMAN: It has been moved and seconded that Dr. L. A. Merillat be named secretary of the next meeting. If there is no objection, I will declare him elected.

As I see that there is no paper to be read, I will entertain a motion to adjourn and go where there are papers to be read. It is through no fault of mine, gentlemen, that I did not secure them. (Motion was then made, seconded and carried that the meeting be adjourned.)

FRIDAY MORNING, NOVEMBER 21, 1919

The meeting was called to order at 9:30 a. m., President V. A. Moore presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing this morning is the report of the Executive Board.

DR. MAYO: Mr. President, the following applications have been received and favorably reported on by the Executive Board:

Dr. W. G. Reed, Marble Rock, Iowa; L. M. Graham, Iowa; T. H. Ingraham, Jr., Alabama; G. T. Asquith, West Liberty, Iowa; H. H.

Emerson, Little Rock; Hugh F. Walker, Ohio; Lloyd J. Brown, Arkansas; Francis A. Humphreys, Toronto.

The committee recommends that these names be accepted and, in the case of Dr. Humphreys, the By-Laws be suspended and that they be elected to membership. Dr. Humphreys is a 1919 graduate who has been in service.

DR. HOSKINS: I move that the recommendation be approved.

(The motion was seconded and carried.)

DR. MAYO: It is recommended by the Executive Board that the suggestion of the President that a committee be appointed to consider the problem of veterinary medicinal preparations with reference to their approval by a committee of this Association be approved and that the President be authorized to appoint the committee.

(It was moved by Dr. Kinsley, seconded and carried that the recommendation be approved.)

DR. MAYO: The Executive Board recommends that the resignation of Dr. Dalrymple as Editor of the JOURNAL be accepted, and that Dr. J. R. Mohler be elected Editor of the JOURNAL for the coming year, and that the salary of the Editor be fixed at \$2,100.

(It was moved by Dr. Kinsley, seconded and carried that the recommendation be approved.)

(Dr. Mayo read telegram from the Montana Veterinary Association, sending greetings.)

REPORTS AND APPOINTMENT OF COMMITTEES

DR. MAYO: I have a report of the Budget Committee. This committee recommends that the special Committee on Abortion Disease be allowed an appropriation of \$500, or so much thereof as necessary to carry on their work. This proviso applies to all of these recommendations.

(Dr. Mayo read the report.)

(It was moved by Dr. Kinsley, seconded and carried that the recommendation be approved.)

THE PRESIDENT: The next order of business will be the reports of the committees. First, we will have the report of the Committee on Necrology.

(Dr. Hollingworth read the report, which will be published later.)

(It was moved, seconded and carried that the report be accepted.)

THE PRESIDENT: Is the Committee on Resolutions ready to report?

DR. COTTON: Dr. Cary has the partial reports. I don't think he is ready at this time.

THE PRESIDENT: Is it the desire that we take up the program and hear these reports a little later?

DR. EICHHORN: Mr. President, in connection with a motion made by Dr. Merillat, I advocate a Committee on Organization of this Association in connection with the International Congress to be held possibly in the year of 1921 in this country. I talked this matter over with Dr. Merillat, and I don't think that he presented the

suggestion in a way so that it could be possible to go ahead with the work and be ready for the International Congress in the year 1921.

In the organization of such an International Congress, it is essential that at least a year and a half or two years' time be given to a committee to organize the work so that it would be in all respects ready for the completion of the problem, and therefore I think it would be very essential that if a committee be appointed it be such that it can go ahead with the permanent organization of this kind, and that it be authorized by the Association here to conduct the official correspondence with the authorities in Washington and also with the authorities in Europe.

I think immediate steps should be taken by such committee for obtaining permission to hold the meeting in the United States, and I make a motion that a committee be appointed at the present time, which will serve later as a nucleus for the permanent organization committee, and that the committee be authorized to immediately correspond, officially, with the permanent committee in Europe, and also with the United States Government, with the view of getting the work started.

THE PRESIDENT: I would say that the motion made by Dr. Merillat, and carried, that a committee be appointed to investigate this matter, I think, will cover the point. It will be up to the committee to make that investigation, and to report next year what should be done.

There have been authorized three committees by the Executive Board or by direct motion from the floor, which I will be glad to announce at this time. The first was a committee to consider the advisability of establishing some definite method of procedure or relationship between the A. V. M. A. and State and local veterinary organizations, and to report at the next meeting as to what can be done. I will appoint W. H. Welch, U. G. Houck, W. H. Dalrymple.

The committee just referred to by Dr. Eichhorn, and authorized by a motion made by Dr. Merillat, to consider the meeting of the International Veterinary Congress, I will announce as L. A. Merillat, A. Eichhorn, J. R. Mohler, D. S. White and the incoming President, Dr. C. A. Cary. I have appointed Dr. Merillat as the temporary chairman of this committee, as he made the motion. I would suggest that the committee meet at the call of the temporary chairman and consider the question of electing their own permanent chairman. I make this suggestion and this appointment of temporary chairman in order not to hamper in any way the work of the committee. It may be found desirable that the chairman be located in Washington, but this entire matter will be left to the committee to report at the next meeting.

The other committee was one recommended by the Executive Board relative to an investigation and report as to the feasibility of establishing a permanent committee for the investigating and reporting of unofficial veterinary remedies, that is, remedies for therapeutic

and prophylactic purposes. I will appoint on that committee H. J. Milks, Dr. Cox, and Dr. Bergman. I think that concludes all of the committee appointments.

We were obliged to abandon a part of our program on Tuesday. The first paper on the list that was omitted was that by Dr. Welch, which I believe he wishes to be placed at the end, and Dr. Baker, who has a paper on "Sheep Practice," is not here. There is a special request that the paper of Dr. Watson be presented. I will, therefore, call upon Dr. Watson to present his address.

NOTICE OF AMENDMENT TO CODE OF ETHICS

DR. KOEN: Before the paper is presented, I have a notice I want to read.

(Dr. Koen read the following notice relative to a proposed change in the Code of Ethics:)

"I hereby give notice of a proposed change of Section 7, Article 19, of the Code of Ethics, to be presented at the next meeting of the Association."

THE PRESIDENT: That will be referred to the Executive Board, and taken up at the next meeting.

REPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION

DR. FITCH: Inasmuch as the work of the meeting so far has been along the line of committee reports, and I notice the chairman of the Committee on Intelligence is in the room, might it not be well to take up that before taking up the papers?

THE PRESIDENT: If Dr. Dunphy is ready to report, we will hear the report of the Committee on Intelligence and Education.

DR. DUNPHY: Mr. President and Gentlemen of the Association, I desire to ask your indulgence in regard to this report, as unfortunately the majority of the committee could not be present and it was left with Dr. Kiernan and myself. Dr. Kiernan has been so busy with the duties incident to the Bureau work that we had no time until yesterday to get the report, and fortunately we were unaware of the change to be made in the regular work by making the excursion yesterday and we intended to report yesterday.

(Dr. Dunphy read the report, which follows.)

To the President and Members of the American Veterinary Medical Association:

In submitting the report of the Committee on Intelligence and Education, your committee desires to be pardoned for the brevity of the report, as the details of the work will be filed with the Secretary for the use of the Executive Board. Your committee is handicapped to a considerable degree by the absence of a majority of its members, so that certain phases of the report could not be given the attention that they merited.

From inspections of colleges that have been made and reliable information that has been gained in various ways, the committee is of the opinion that there is still a great effort being made by the

various colleges to keep up to the desired standard, and that veterinary education is gradually reaching a higher plane, which will enable the profession to take its place among the other learned professions and stand side by side with its sister profession, that of human medicine and surgery.

Unfortunately for our veterinary institutions of learning, when our country became involved in the great world war the majority of the students were called to the colors, and teachers and students alike were eager to do their part in helping to subdue the arch enemy of civilization and mankind. As a natural result of these conditions the work of the colleges was entirely disrupted and their endeavors halted to such a degree that several of the schools closed their doors and discontinued their work entirely.

Since the signing of the armistice and the release of many students and instructors the colleges are just beginning to work gradually toward normal conditions, and your committee believes that patient indulgence on the part of the Association toward the colleges is advisable, as the colleges are not alone in this particular condition, for we find public utilities and private business in the same chaotic condition.

The colleges in general are striving to come up to our required standard, and while some are greatly in advance of others, the committee believes that all are doing their best to advance the standard of veterinary education and training.

Since our last report was submitted we find a new college asking for recognition by our Association, the prospectus of which has been submitted to your committee. While the committee has not inspected this institution, owing to the fact that the member of the committee to whom this work was entrusted was not able to meet with us and make this inspection on the way, still the committee has the report of the veterinarian who inspected this college for the Bureau of Animal Industry, and other reliable information that warrants us in recommending it to be placed on the accredited list of our Association for the present term, so that its graduating class of 1920 may be eligible for admission to this Association.

Another matter that your committee desires to direct your attention to is the United States Veterinary College at Washington, D. C., which is asking for reinstatement. This has been an unsettled problem for several years. Your committee, on visiting Washington, found two veterinary colleges in operation, one on the accredited list, but very poorly equipped and adapted for giving a veterinary education in accordance with the requirements of this Association. The other institution had buildings and equipment for carrying on the work, but certain conditions (notably a nonresident dean) did not appear satisfactory to your committee. In view of the fact that the committee was not satisfied with the work of the accredited school an amalgamation of the two colleges was advised, and it seems that when this arrangement was on the verge of completion it fell through, and the committee is advised that the accredited school has

been discontinued. A recent visit by a member of this committee shows that the institution that was not accredited is now in shape to comply with the requirements of this Association, and your committee sees no reason for its not being admitted unless in the judgment of the Association a night school can not keep up to our standard and give satisfactory work.

Another matter that your committee wishes to bring before the Association is the condition that exists at the Veterinary Department of the Washington State University. This college work is carried on at two separate places. The two first years are given at Pullman, the other part of the course is completed at Spokane. The member of the committee who visited this institution found very careless and unsatisfactory work being done at Spokane, and those in charge not keeping in touch with the Pullman division of the department. The instructions given to the students were entirely out of touch with the present-day views of veterinary science. Your committee believes that the teachings given at this place leave the student's mind in a very chaotic state in regard to subjects that are generally accepted as scientifically settled. The committee would recommend that Dr. Nelson be notified by the Secretary that this condition be remedied at once or the college will be suspended from the accredited list.

In view of the facts set forth in this report your committee desires to recommend that a degree of leniency be exercised toward the colleges as far as consistent with the requirements of the Association, while they are recovering their balance after being disorganized by the unavoidable conditions caused by the war.

We would respectfully recommend for your consideration the following colleges to be placed on the accredited list of this Association:

Alabama Polytechnic Institute, College of Veterinary Medicine, Dr. C. A. Cary, Dean, Auburn, Ala.

Chicago Veterinary College, Dr. E. L. Quitman, Dean, 2533 State Street, Chicago, Ill.

Colorado State College, Division of Veterinary Medicine, Dr. George H. Glover, Dean, Fort Collins, Colo.

Indiana Veterinary College, Dr. William B. Craig, Dean, Market and Davidson Streets, Indianapolis, Ind.

Iowa State College, Division of Veterinary Medicine, Dr. C. H. Stange, Dean, Ames, Iowa.

Kansas State Agricultural College, Veterinary Department, Dr. R. R. Dykstra, Acting Dean, Manhattan, Kans.

McKillip Veterinary College, Dr. Charles Frazier, Dean, 1639 Wabash Avenue, Chicago, Ill.

Michigan Agricultural College, Division of Veterinary Science, Dr. R. P. Lyman, Dean, East Lansing, Mich.

New York State Veterinary College, Dr. W. Horace Hoskins, Dean, 26th Street and First Avenue, New York, N. Y.

New York State Veterinary College, Dr. V. A. Moore, Dean, Cornell University, Ithaca, N. Y.

Ohio State University, College of Veterinary Medicine, Dr. C. V. Brumley, Acting Dean, Columbus, Ohio.

St. Joseph Veterinary College, Dr. E. A. Logan, Dean, 9th and Mary Streets, St. Joseph, Mo.

University of Pennsylvania, School of Veterinary Medicine, Dr. William J. Lentz, Acting Dean, 39th Street and Woodland Avenue, Philadelphia, Pa.

Ontario Veterinary College, Toronto University, Toronto, Ont., Canada.

Texas Agricultural and Mechanical College, School of Veterinary Medicine, Dr. M. Francis, Dean, College Station, Texas.

The following colleges have established the four-year high-school entrance requirements:

Alabama Polytechnic Institute, Chicago Veterinary College, Colorado State College, Indiana Veterinary College, Ohio State University, Iowa State College, Kansas State Agricultural College, Michigan Agricultural College, New York American Veterinary College, New York State College, State College of Washington, Texas Agricultural and Mechanical College, United States College of Veterinary Surgeons, University of Pennsylvania Veterinary College, University of Toronto Veterinary College.

McKillip, St. Joseph and Cincinnati Veterinary Colleges have not yet adopted the standard. McKillip and St. Joseph have adopted the four-year course but for the present year have not adopted the four-year high-school requirement for entrance.

Owing to certain contingencies that may arise, the committee deems it advisable to recommend that in case a student having the requisite number of credits has entered a school that is not on the accredited list and taken his first year work, in case of failure of the school to become accredited, or in the event of its closing, the said student may be taken into an accredited college to complete his course without prejudice to the institution.

In case of students entering a college that requires only a three-year high-school entrance admission, such student should be allowed, if he desires, to finish his course in an accredited school without prejudice to the school, but his admission to the A. V. M. A. must be determined by a special act of the Association.

Your committee also desires to make another recommendation which we believe will appeal to the patriotism and fellow feeling between friends and allies in general, after the greatest war of the world, where the cause of democracy, human freedom and protection of the weak was arrayed against autocracy, cruelty and semi-savagery, and, thank God, came out triumphant. This committee recommends that the rules be suspended and eight distinguished gentlemen be elected as honorary members of this Association, namely:

Major General M. W. Ireland, Washington, D. C., Surgeon General U. S. Army.

Major General Sir Frederick Smith, K. C. B., London, England, former Director of the Royal Army Veterinary Corps.

Major General Sir Robert Pringle, C. B., D. S. O., former Director General of the Royal Army Veterinary Corps.

Major General Sir S. J. Glenkinsop, K. C. B., England, Director General of the Royal Veterinary Corps.

Major General Sir John Moore, K. C. B., England, Director General of the Royal Army Veterinary Corps in France.

Brigadier General Frey, France, Director General of the French Army Veterinary Corps.

Colonel C. F. Morse, Washington, D. C., Director Veterinary Corps, U. S. Army.

Colonel J. J. Aitken, England, Member Royal Army Veterinary Corps, delegated to assist in organizing the Veterinary Corps of the U. S. Army.

These distinguished gentlemen have been vouched for by the following members of our Association: C. J. Marshall, Ray J. Stanclift, D. S. Tamblyn and P. A. Fish. We sincerely hope that the Association may see fit to honor them with election to this organization.

Respectfully submitted.

GEO. W. DUNPHY,
Chairman of Committee.
J. A. KIERNAN.

DISCUSSION OF REPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION

(Dr. Hoskins moved that the report be received and the recommendations be taken up separately. The motion was seconded and carried.)

DR. DUNPHY: The first recommendation in the report would have reference to the United States Veterinary College being admitted to this Association.

DR. ERNEST: With reference to the committee's report on the United States College, I would like to make a motion that that report be accepted with a provision that the Executive Board prescribe the time regarding night classes conducted at that institution. The report of the committee last year made no mention of a night course being disapproved by the A. V. M. A. The school was an applicant for recognition at the conference in Philadelphia, and the trustees have endeavored to comply with the constructive criticism offered in the report last year and are again applicants for recognition by the Association. The report recommends that this recognition be granted, however, with the provision discussing the night course. In fairness to the institution it would seem that recognition should not be withheld now, if the requirements or the criticisms offered by the committee last year have been met. I ask and move that recognition be granted this college, with the understanding that the Executive Board notify the institution as to when day classes shall be started, if that is deemed desirable by the Executive Board.

DR. HILTON: As the Association is taking as its object the approval of veterinary colleges, I am opposed to putting a college on the accredited list which gives hours of instruction from 5 to 10 in the evening, when the students attending that college are, during the daytime, engaged in other business; that no matter what sort of faculty it has, it can not give a satisfactory veterinary course, and I think if this Association places that college on the accredited list, it is going back 50 years. That means that under those conditions it can not give the proper veterinary training in the institution.

DR. ERNEST: May I again ask indulgence? This institution has been in existence since 1894; almost 26 years have been put in by that institution in educating veterinarians. Before the Executive Board I had the pleasure of presenting the records of those men who had gone out. I ask of anyone familiar with the affairs of the live-stock work of the State, who are familiar with the work of those practitioners in that State, of those men that had to do with army service, which accepted pretty nearly 25 per cent of the total living graduates of this institution in the United States, of the men engaged on the State boards who have had to examine these men—I appeal to you, gentlemen, that in fairness you can not prescribe that you shall not recognize this institution from the fact that they have conducted night courses. For these twenty-some years these men have gone out side by side with other men and have made good—the proof of the pudding is in the eating. I ask favorable consideration of my motion.

DR. STANGE: It doesn't seem to me that the success of the old graduates of this institution has much bearing on the present requirements. We have an institution that graduated the first class in 1880. We have a large number of prominent alumni among these older graduates, but I don't believe there is one of those alumni or a single member of the faculty that would have the poor judgment to come before an association of this kind and ask for recognition if we still pursued the same kind of a course that we did when those men entered the institution. If we are going to make progress we have got to consider schools on the present basis and how they are meeting present requirements. I don't think what the old alumni did has any bearing on the question at all; it is the question of what the alumni that graduate from this time on are going to be. That is the question that concerns us, and it seems to me that the members of this Association ought to consider seriously whether it is possible to turn out men who are earning a livelihood during the day and attending schools during the evening. We are getting a wide gap, it seems to me, between such requirements and those of State institutions. Three hours' labor and one hour's lecture! How these men can take a 4 years' course and work in those hours or anywhere near the hours required by other institutions, I can't understand. It seems to me, if we are going to allow night school for giving this limited amount of work, they ought to have a longer course.

DR. KINSLEY: The committeemen of the Intelligence and Education Committee did not state the present requirements for matriculation for the school in question, and from information obtained in the Executive Board, we were informed that the requirement for this year's matriculation was three years of high school. It seems to me that automatically eliminates the school from recognition, as the requirements for school is four years of high school. Gentlemen, we have been hearing at this meeting and at several previous meetings the standing of our profession compared to the standing of other professions. Our Committee on Reconstruction made a strong point of educational requirements, particularly of the matriculation at veterinary colleges being one of the handicaps, if not the principal handicap, of recognition of our profession. It seems to me we are not in position to accept this school on present matriculation requirements.

DR. FISH: It seems to me it is very important for this Association to keep in mind that in educating a veterinary student it is the prime business of that student to attend the course during the daytime when it is given. As I understand it, in regard to the institution, veterinary education is a side issue, that the students who attend there really have some other functions during the daytime and then during their leisure time spend that in the desire for a veterinary degree. It seems to me that it is putting it out of order. We want to emphasize that the student is in earnest and wants to be a member of a learned profession. He ought to give all the time to it required by the curriculum.

DR. DUNPHY: In defense of the committee making this recommendation, I might say that two members of the committee that were here considered this. We looked at it from that very angle and we have discovered that in certain State colleges young men were working part of their way through to a considerable extent. For instance, they were doing sufficient work to pay for room and board. The young men who were taking the course in this institution were in a different position. They were working at clerkships, but short day work, as I understood, and they were young men with education enough to admit them into the clerkships through the civil service examination, and we felt that this was an opportunity for a young man who had the ambition to want to better his condition. We felt that the State boards and their own examining boards were now requiring examinations of every man that practiced in the majority of the States, and this examination is good and stiff in our State and I believe it is the same in other States. In our State quite a percentage of the graduates of our State college (and I believe our State college is as good as any) failed to pass that examination.

DR. HALL: I think that there is the question of whether a school of this type turns out men habitually and not accidentally. I believe most of us wish to see the standard in the veterinary profession raised, but if you can take a man and require that he should have

his license education and prerequisite of any school and send him to any school which will give him as many hours of work of as high a grade as is required, you have done all that can be done at the present time. I think that the night school will in time disappear from veterinary education as it has disappeared from the education of the M.D.'s, but at the present time I see no reason why a school of this type should not exist. If it can't give it in four years, then give it in five. Most of you are familiar with the day school. Possibly you do not realize the character of the men in general who attend the night school. The man who is willing to work all day and then work half the night has certain qualities understood. He must have a certain amount of ambition or he would never undertake anything of that sort. As far as the education of these men in the night school in Washington is concerned, I venture to say that on the whole they are as highly educated and perhaps a bit higher educated than the man that goes to the average day school. There is the question, if you can get the work out of a man, the right type of work, require the highest standards of admission, even if you have to have your night school run five or six years. It seems to me, at the present time, we would do well to recognize this, believing that in the future it will drop out of our system.

THE PRESIDENT: The question has been called for.

(The motion was lost.)

DR. DUNPHY: The next recommendation, gentlemen, that the committee has brought before you, is to meet contingencies that may arise owing to the unsettled conditions of the college, and it reads as follows:

"A student entering a college that is not accredited, having a sufficient number of credits to enter, the same number of credits that is required by schools on the accredited list, and has taken his first-year work, in case of failure of the schools being accredited or in the event of its closing its doors, the said student may be taken into an accredited college to complete his course without prejudice to the institution that takes him in."

DR. HOSKINS: Moved.

(The motion was seconded and carried.)

DR. DUNPHY: The next recommendation, gentlemen, I want you to pay attention to.

(Dr. Dunphy read the recommendation, as follows: "In case of students entering a college that requires only a three-year high-school entrance admission, such student should be allowed, if he desires, to finish his course in an accredited school without prejudice to the school, but his admission to the A. V. M. A. must be determined by a special act of the Association.")

(Moved by Dr. Hoskins that it be approved. Motion was seconded.)

DR. FISH: Isn't that contrary to it?

DR. KINSLEY: Does that mean that this matriculant must be a four-year high-school man?

DR. DUNPHY: The first recommendation said he must be a four-year high-school man. The second recommendation was to protect students that had already entered these colleges with a view of eventually being eligible to the B. A. I. There are many students that I wouldn't recommend, but a number of students have entered colleges in this way. What are we going to do with them if these colleges do not become accredited or if these colleges should go out of commission? I was raised a poor boy, and I had to work my way through the world, as I was the son of a widow, and my sympathies go out to the boy that has an ambition to rise and get an education, if he happens to be fooled, we might say, or entered into a college of this kind without knowing actually where that college stood. You know that the registrar of any college, when the student comes and presents his credentials and lays down his money, if it is counterfeit, doesn't tell said student that it is all right. They don't say, "We can educate you here, but if you go to another school you will get better prepared," and many innocent students may be caught in the net.

DR. SIMMS: I believe it is an established fact that the law excuses no one. I also feel that our profession is larger than any man or single group. If we have set up a four-year high-school requirement, I feel we are unjust and unfair to the entire profession if we let down the bars just because he happens to have entered this, that, or the other school. I am opposed to this recommendation.

DR. MAYO: Mr. President, it seems to me we are dealing with a problematical situation, that may come up in the future. I think, if it does come up in the future, we ought to deal with it then and not now.

DR. HUGHES: We are not dealing with a problematical question. We are dealing with a question that will confront us during the coming years and almighty soon, it seems to me. I don't want to mention what school I have in mind, but schools are not going to continue to exist under present times and the other schools will all be confronted with this proposition. What are we going to do with the man of the school that is established? In justice, we should make a contingent ruling. We have all suffered during the last three years. I do not want to raise any rancor in this body by citing contingencies that arose or that might have been overcome by a little thought. I might say that I am back of this suggestion. I don't know whether it is right for me to say that. I made the suggestion to Dr. Dunphy that some provision be made for students in this country.

DR. DUNPHY: By way of explanation, I might say that while Dr. Hughes mentioned this to me last evening, this question was brought before the committee by a subcommittee of the Executive Board of this Association. Don't think for the moment that this is the suggestion of any one man. This problem was laid before us by a subcommittee of the Executive Board.

DR. STANGE: I was chairman of that subcommittee, and I think in fairness to the Committee on Intelligence I ought to make a little explanation. As I understand it, the provision is this, that we have sophomores, juniors and seniors in a number of private veterinary colleges today, who entered those schools in perfectly good faith and thought those schools were accredited by this Association. It is not the fault of those students that the school isn't in good standing now. The question is, are you going to ask those institutions to continue running one, two or three classes until they run out, or are you going to make it possible for those students to complete their education in some other institution? It seems to me, if we can prevent students from entering from this time on, in nonaccredited schools, we are perfectly safe. We are simply giving these sophomores and juniors now a chance to complete their education. It seems to me it is on that basis we ought to question it.

(It was moved, seconded and carried that the recommendation be approved.)

DR. DUNPHY: Your attention has been called to colleges that have, at present, adopted the four-year high-school standard. There are two colleges represented that have not adopted that standard at present. That hasn't been considered by the Association, and if that is to be considered, it should be done now, and then I desire the Association to take up the last recommendation. We have asked for a suspension of the rules, or a suspension of the By-Laws, and that these nine distinguished gentlemen be elected to honorary membership in this organization. One recommendation applies to the honorary membership, the other recommendation was for the Association to decide on the two colleges that we reported as complying with the four-year veterinary course but had not yet come up to the standard of the four-year entrance requirements.

DR. KINSLEY: Mr. President, I move you that the recommendation relative to the nine for honorary membership be received and the rules suspended and the men be elected to honorary membership.

(The motion was seconded and carried unanimously.)

DR. FISH: I, for one, should like to be on record that this Association is maintained for a single standard and not a double standard. I don't know what reasons may be involved.

DR. HUGHES: May I ask that the names be read again?

DR. DUNPHY: There are only two schools. The Cincinnati Veterinary School was dropped from the recommendation for the accredited list. The two schools that are at present operating under the conditions that existed with the B. A. I. are the McKillip of Chicago and St. Joseph, Mo.

DR. KINSLEY: It seems to me that we are not in position to act on those schools now. That is a matter of action when the applicants come in for membership. Aren't we anticipating something?

DR. MAYO: Mr. President, does the committee recommend that the Cincinnati Veterinary School be dropped? I move that this action of the committee be approved.

DR. HILTON: Mr. President, before going any further I would like to have that a little more clear. Do you understand that the committee recommends the two schools on the list?

THE PRESIDENT: The committee recommended that the Cincinnati school be dropped from the accredited list and the motion is that the recommendation be approved.

(The motion was seconded and carried that the recommendation be approved.)

DR. DUNPHY: It is also recommended that the Washington State Veterinary College be notified by our Secretary, or that Dr. Nelson, the Dean of that college, be notified by our Secretary, that he must change the conditions referred to in this report or that school will be suspended.

DR. MAYO: I think that the word "automatically" should be put in there.

DR. DUNPHY: I'll accept that.

(The recommendation was seconded and carried.)

THE PRESIDENT: It would seem, Dr. Dunphy, that this Association ought to act officially on the list of accredited schools, as they require some change.

DR. DUNPHY: The accredited schools have been read in this report of the committee.

THE PRESIDENT: This is a recommendation made by the committee that certain schools named in the report should be put on the accredited list. It seems to the Chair that a motion should be made and acted upon regarding that special recommendation.

DR. STANGE: I make a motion that the schools recommended by the committee be approved by the A. V. M. A.

(The motion was seconded.)

DR. MAYO: I think we ought to have in the report of the Association a printed list of those schools that do meet the requirements, because I get many inquiries and they want a list of the accredited schools and I think it is very important that the list recommended by the committee should be read to this Association and go in the records. (Applause.)

THE PRESIDENT: Dr. Dunphy will read the list.

DR. DUNPHY: Alabama Polytechnic Institute; Chicago Veterinary College; Colorado State College; Indiana Veterinary College; Ohio State University; Iowa State College; Kansas State College; Michigan Agricultural College, Veterinary Department; New York American; New York State College; State College of Washington, with a question mark in regard to the action that Dr. Nelson may take; Texas Agricultural and Mechanical College; University of Pennsylvania Veterinary College; University of Toronto, Ontario, Veterinary College; McKillip Veterinary College of Chicago, with a question mark in regard to the entrance examination, and also St. Joseph with the same question mark, which, owing to only two members of the committee being present, should be settled by this Association.

DR. R. C. MOORE: I think the question put before the house a little while ago was regarding future consideration of students in certain veterinary colleges. As that motion was being put, I think as I understand it, two colleges were included in the list to be dropped that I didn't hear in time to make any reply; in fact there was no opportunity to make any explanation to this body. I have been a member of this Association a good many years. Last year we had to meet a condition that was facing the schools. At the Philadelphia meeting there was a recommendation made by the Committee on Intelligence and Education concerning an agreement or an understanding that had been entered into by a subcommittee of that committee that had met in Washington and in conference with the Surgeon General and the Bureau of Animal Industry decided to prescribe what course should be pursued last year and this year as to entrance requirements. That report, as I understand, was adopted by this Association at Philadelphia. After that, there was a recommendation made, I believe, from the committee that the requirements for this year be four years of high school. The B. A. I. circulars came out and they allowed the admission of students on the two-year basis, with the view that the B. A. I. was pressed pretty sorely for men to meet the conditions, and we were in doubt as to what should be done. The Board of Veterinary College Private Schools met in Chicago in May and after an all-day discussion of this problem, into which meeting your secretary was called for what information it could gather from him, and finally after a long session, a motion was made by the Dean of the Chicago Veterinary College and unanimously carried, to follow the requirements of the B. A. I. for this year. When the St. Joseph Veterinary College followed those requirements we stated it in our requirements, a copy of which I have in my pocket. We discussed the reasons why we were following that standard for last year, and, in fact, back of that, had made a good many promises to young men that had to enter the service last year. We adopted that, and in our catalogue I stated emphatically that that was for next year only, put it in capitals. We will meet the requirements of the A. V. M. A. We moved up from 28 weeks of actual teaching time to 32 weeks. We have met you on everything excepting that entrance requirement, and we were in that. I think every reasonable man will agree that the two standards coming up put us in a position that was hard to overcome, and in face of that, Chicago, McKillip and St. Joseph unanimously agreed to accept the requirements of the A. V. M. A. I don't believe it is hardly fair to the student body of that school college that they should be ruled out of the requirements, because of us failing to meet that one condition.

Since I have been in this meeting, members have told me that I said that we would not pay any attention to the immediate requirements at St. Joseph. I want to deny that most emphatically. No such thought ever passed my mind. No such word has been uttered from that institution. I am the sole manager of that institution and

my word goes in everything pertaining to it, and I want to pledge you right here, we will meet your requirements in everything. We would have met them before, but we could not see our way clear to meet them this year, on account of the agreement entered into at Washington and the acceptance of that report of the Committee on Intelligence and Education, and we felt we could not possibly throw down those promises, so we were placed in that dilemma. I will leave this matter in your hands. I believe you are fair dealing people. I don't believe you want to crowd us out of existence. All we ask is an opportunity. We haven't rebelled. We agreed, on the other hand, and published that agreement that we would meet your conditions this year. I didn't understand that this school was put in this movement. I would like to ask you to reconsider that. (Applause.)

DR. CRAIG: I want to rise to make a correction. At that meeting in Chicago, the Indiana Veterinary College voted to adopt the requirements of this Association, and we returned to Indianapolis and presented the matter to the Trustees. The Trustees unanimously decided to abide by the rulings of the A. V. M. A. and adopted the four-year requirements.

THE PRESIDENT: I understand that the motion made by Dr. Stange is that it be approved. Is that the correct motion?

DR. STANGE: Yes, sir.

THE PRESIDENT: And the schools with a question mark after them are not included in this motion that is now before us.

(The motion was seconded and carried.)

THE PRESIDENT: Now the question is on the schools with a question mark, as suggested by the chairman. What shall we do with those? Will Dr. Dunphy please name the schools in question?

DR. DUNPHY: Washington State Veterinary College, on account of the conditions that existed, where the last two years were given. McKillip Veterinary College and St. Joseph Veterinary College, that had not yet come up to the four-year high-school standard, but were working under the standard of the B. A. I.

THE PRESIDENT: The recommendation before the house without a motion is on the acceptance of the two schools just mentioned and putting them on the accredited list.

DR. R. C. MOORE: Might I be permitted to make a motion that the St. Joseph Veterinary College be accredited on this, with the understanding that we meet every requirement?

(The motion was seconded and carried.)

DR. HUGHES: Mr. Chairman, I desire to call attention to the fact that at this meeting that was announced the Chicago Veterinary College was represented and that any representatives of that college must be ratified by the faculty. As soon as the motion was adopted by that meeting it was voted unanimously and decided to require the four-year high-school course. I want a little explanation as to that. Did other schools, not doing the same thing, bring it up, or did some

one man act in a dominant fashion and put the thing over? I would like to know something along those lines.

DR. KINSLEY: I rise to a point of information. We want to be straight in the future. We have just passed a motion that requires a suspension of the rules. We have on our records the requirements, as I understand it, and I don't see how they can be passed on without a suspension of rules.

DR. STANGE: I move that we reconsider the last motion that was passed.

(The motion was seconded by Dr. Fitch and carried.)

DR. R. C. MOORE: Mr. Chairman, before we go further, I want to be clear on one statement of Dr. Hughes. I was representing the St. Joseph Veterinary College with full authority. Whatever I agreed to would be the action of that board. There were five members of the faculty of the Chicago Veterinary College present and the Dean included in the number.

DR. STANGE: I move that the school considered in that motion be not put on the accredited list. In making this motion I think we must be fair with everybody. We have just refused one school consideration on an attempt to make good. I don't see why we should turn one down and accept another. I think we ought to cut the line sharp for everybody, and if we are going to give one consideration, give it to all.

(The motion was seconded.)

DR. STANGE: I had in mind the two schools that did not meet the entrance requirements.

DR. R. C. MOORE: I do not like to call attention to defects anywhere, but I read a day or two ago in one of the publications wherein they stated that the veterinary college would not insist upon the high-school graduation. I want to know whether that is to be taken as violation of these rules or not. That school has been included and accepted.

THE PRESIDENT: You have heard the motion. Is there any further discussion?

DR. COTTON: I wish the Chair would explain the sense of this motion. Everybody is at a loss apparently, as to what we are voting on now.

THE PRESIDENT: The motion, as the Chair understands it, is this: The Committee on Intelligence and Education has recommended the acceptance of two schools, St. Joseph and McKillip, who are not living up to the entrance requirements provided for in the eligible list of colleges for this Association. It has been moved that this recommendation be rejected, that is, that these two schools will not be placed on the accredited list. That is the motion as I understand it, open to correction if I am wrong. Is there any further discussion?

(The motion was seconded and carried.)

THE PRESIDENT: That concludes, I think, the recommendations of the Committee on Intelligence and Education.

DR. W. M. BURSON: I represent the Veterinary Division of the State College of Agriculture of the University of Georgia. We are giving veterinary degree work to three classes, freshman, sophomore and junior. During the previous three years' sessions we have given the freshman and sophomore work only. Our plan is now to continue our students through to graduation; we expect to give senior work beginning next year, that is, the college year, 1921, and hope to have men ready for graduation in June, 1921. I request an investigation by this committee.

THE PRESIDENT: That will be referred to the Committee on Intelligence and Education.

Shall we finish these committee reports before we go on with the papers? Is the Committee on Resolutions ready to report?

(Dr. Cary was not present.)

THE PRESIDENT: I think that concludes the committees, with the exception of the one on Resolutions, which I will call for a little later.

DR. J. G. WILLS: If I am in order, I would like to state that since the report of the International Committee on Bovine Tuberculosis, two members of the committee, who were unable to be present, have sent communications which were received after the report was made. One of them is from the lay member of the committee, Mr. J. J. Ferguson, and the other from Dr. Traum. The letter from Mr. Ferguson deals with a new phase of the tuberculosis problem, one which has not received general recognition, and if the Association deems wise the committee would recommend that these two letters be received as supplementary to the report to the committee and made use of by the committee next year when the personnel is known. It deals in general with the same phases of the question as reported by the committee on Monday. The reference, however, by Professor Ferguson is somewhat different, and if the Association wishes, one paragraph will explain what he has in mind, if they care to hear it. Otherwise, I would move that it be placed on file.

(The motion was seconded and carried. The communications referred to were appended to the report of the committee and appear in the proceedings in the JOURNAL for February, 1920, pages 551-553.)

PRESENTATION OF PAPERS

THE PRESIDENT: We will revert now to the reading of the papers, and I will call upon Dr. Watson for his paper on "Ulcerative Lymphangitis."

(Dr. Watson read his paper, which will be published next month.)

THE PRESIDENT: Shall we have Dr. Cary's paper read?

(Dr. Cary requested that his paper be read by title only.)

THE PRESIDENT: The next paper would be "The Economic Production of Hogs in the South," by Prof. D. T. Gray. I have a note asking that his paper be read by title and published in the proceedings.

The next is a paper by Drs. Ransom and Hall on "Parasitic Diseases in Their Relation to the Live-Stock Industry of the Southern United States."

(Dr. Hall read this paper, which will be published later.)

THE PRESIDENT: The next paper is by Dr. P. J. Orchard, of Baton Rouge, La., on "Strongylidosis in Horses and Mules."

(Dr. Orchard read his paper, which appears elsewhere in this issue of the JOURNAL.)

DR. HADWEN: I would like to say a word of appreciation for the paper we have just listened to. I am certain that we have been neglecting internal parasites too much. Looking back to ancient history, one sometimes sees a great deal about treatment for worms. I think we have paid more attention to the parasites we see externally on the skin, and yet they are doing just as much harm internally. It is a self-evident thing to me, when one compares the health of the city horse to the horse which is owned by the farmer, and I think the answer is very easy. One animal is apt to contaminate himself out in the field and the other is fed indoors and doesn't get a chance to infest himself in the same degree.

I have one word to say about treatment which has been mentioned in the paper we have heard. I think it is very plain that one treatment is not sufficient to cure a case of parasitism in a horse, as we know that so many of the parasites are protected by the body itself and can not react to the treatment. Nevertheless, in the suitable period of treatment of the parasites which were protected in the intestinal mucous membrane, it would then be subjected to the action of the drug we have given. (Applause.)

DR. ORCHARD: In answer to that, gentlemen, we treat so few, two, three, and as high as ten times, and it is pretty hard to get a planter to lay his mules up. He will give you a day or a day and a half. He is generally busy the year through. Of course the method weakens them a good deal and it is dangerous to treat them too quickly.

DR. HALL: I wish to congratulate Dr. Orchard on the paper he has presented and to say that it is a very pleasing thing to find that a number of the veterinarians here in the South are making these observations which are very badly neglected. The confirmation from the practitioner was generally preached by the parasitologists, a most gratifying thing, most of all to the laboratory man.

As far as his remarks on anthelmintics are concerned, it is too big a topic to discuss at this time. You have a practical proposition before you. The planter has his animals where they are being constantly reinfested, and, as Dr. Orchard has said, he doesn't know what to do. He is between the devil and the deep blue sea. He can either put his animals up and treat them as a routine procedure a number of times a year, or he can let them go until it appears that they are going to die anyway, and then treat them, and that is the wrong time to treat them. All anthelmintics are poison. They must all be used with caution, and in plenty of cases the anthelmin-

tics which will be administered to your horse will kill him when you have waited until it is a good clinical picture of parasitism.

If you will consider what was said in the paper by Dr. Ransom and myself, you will realize that it is true that the Southern livestock owner must assume, as a matter of course, that parasites are always present in sufficient number to be doing some damage, and that if they are neglected they will live to the point where they will cause serious losses by death as well as by disability. The drastic treatments which the gentleman referred to, I ought to defend in this connection, because I am more or less responsible for most of them in the present condition of the subject. Many of them are old treatments. The things which he has recommended are based on clinical experience and are more or less imperfect, naturally. Some of these drugs are anthelmintics of, as he says, years of standing. I am sorry I can not accept the good testimony of anthelmintics and of the value of the drug, but in my opinion, anthelmintics are not worth a continental. It is simultaneously established that some of those drugs are as good as clinical experience has shown them to be, and I have therefore regretfully come to the conclusion that there is no way of judging drugs except by experimental tests. This is not any reflection on Dr. Orchard's competent work. The proof of the pudding from the practitioner's standpoint is the recovery of the animals. I would suggest that instead of the Southern mule owner waiting until his animals show clinical pictures of parasitism he may give treatments through the year or take the consequences. (Applause.)

REPORT OF COMMITTEE ON RESOLUTIONS

THE PRESIDENT: Is there any further discussion? If not, we will now have the report of the Committee on Resolutions.

(Dr. Cary read the report of the Committee on Resolutions, submitting the resolutions which follow.)

Correspondence Schools

Whereas, There exist certain correspondence schools purporting to give a training in veterinary science by mail and which, after receiving a certain fee, grant a diploma or the so-called degree, under which the recipients represent themselves as qualified veterinarians and practice quackery, causing endless dangers to the livestock interests of the Nation;

And whereas, Such schools have been abolished in the various States, yet still exist in one province of Canada, from which their literature is distributed:

Therefore be it resolved, That this Association impress on the Minister of Agriculture of Canada the necessity for the immediate investigation of the claims and practices of correspondence schools purporting to give a veterinary education by mail.

That we further urge all the State veterinary examining boards to prosecute and eliminate the so-called correspondence graduates.

Horse Publicity Association

Resolved, That we recognize and approve the movement to maintain the horse and restore him to his proper sphere in the field of commerce and service of our country.

We pledge our interest and support to the Horse Publicity Association of America created in New York City October 30-31, 1919, by all the allied interests including the veterinary profession and humane organizations. We recommend to our members that they give it their helpful support in their respective States.

Surgeon General, U. S. Army

Resolved, by the A. V. M. A. in convention at New Orleans, La., That we express to the Surgeon General of the United States Army our appreciation of the confidence he has shown in the service rendered by the members of our profession in their unselfish and patriotic efforts, and we pledge ourselves to sustain him in the reorganization of the Veterinary Corps of the Medical Department.

Eradication of Foot-and-Mouth Disease

Whereas, The Bureau of Animal Industry has formulated a definite plan of organization for the controlling and eradication of an outbreak of foot-and-mouth disease should it again make its appearance in this country, this plan being based upon the successful eradication of former outbreaks:

Therefore be it resolved, That this Association indorse this plan as outlined by the Chief of the Bureau of Animal Industry;

And be it further resolved, That a copy of this resolution be sent to the Secretary of Agriculture and the Chief of the Bureau of Animal Industry.

Eradication of Tuberculosis

Whereas, The Bureau of Animal Industry has wisely and conservatively postponed the problem of eradicating tuberculosis until the opportune time, and at this time has decided upon a wise plan through the accredited-herd system:

Therefore be it resolved, That this Association indorse this wise and successful movement of the Bureau of Animal Industry in this direction;

Be it further resolved, That a copy of this resolution be sent to the Secretary of Agriculture and the Chief of the Bureau of Animal Industry.

Resolutions of Thanks

Resolved, by the A. V. M. A. in convention at New Orleans, La., That the members hereby extend to the local Committee on Arrangements a most hearty vote of thanks for their splendid receptions and entertainments;

That we are most thankful to the press for its work in giving publicity to our meetings;

That we are grateful to the manager and owners of the Grunewald Hotel for the acceptable manner in which they have catered to the needs and accommodations of our members;

That we recognize the faithful and efficient service of the retiring officers and hereby tender them our sincere thanks.

Whereas, Dr. Dowling, of the State Board of Health, has furnished this meeting with his fully equipped stereopticon;

Therefore be it resolved, That the Secretary express to him our great appreciation for his valuable assistance.

Whereas, The Pitman-Moore Company gave the members and friends a most delightful boat ride on the great Father of Waters;

Therefore be it resolved, That we most graciously thank them for this most enjoyable trip and the many entertainments given to us on the boat.

C. A. CARY, *Chairman*,
CHARLES E. COTTON,
C. D. MCGILVRAY,
OTTO FAUST.

REPORT OF AUDITING COMMITTEE

The Auditing Committee submitted the following report:

The receipts and disbursements as recorded in the Secretary's books were checked and found to be correct.

The Treasurer's report as submitted to this Association is found to be correct with the exception of a typographical error which was mentioned by the Treasurer and occurs on page 7, line 2, of the report. The figures should read \$28 instead of \$58. The footings and balances are correct as stated in the report.

H. R. RYDER,
L. ENOS DAY,
W. H. ROBINSON.

FRIDAY AFTERNOON

The meeting was called to order by President V. A. Moore at 2 o'clock.

PRESENTATION OF PAPERS

THE PRESIDENT: The first paper is by Dr. E. D. King on "Poisonous Plants of the South."

(Dr. King suggested that his paper be read by title only.)

THE PRESIDENT: Dr. King wishes his paper to be read by title. I think it would be well for him to give us a brief summary.

(Dr. King read his paper, which will be published later.)

DR. HADWEN: I didn't catch what he said about screenings. We have had a good deal of trouble on our side of the line in the last 2 or 3 years through the billets. They have been breaking up the

screenings and have given some trouble. We tried a few experiments with the seeds and it takes a very small percentage. I think it is a very important question and that the profession should take up the poisonings from these screenings which are so often mixed in with apparently harmless feed.

DR. SIMMS: We have had poisoning of poultry. We have found the corn cob very prevalent in these feeds that have been mixed with screenings. When the feeding is done by hand the corn cob will be removed and the feed given without bad results. The report was quite common all over the State, because men were using everything for feed. The birds seemed to die very quickly after they began to show symptoms, and where treatments were not successful the only thing seemed to be to remove the cause.

THE PRESIDENT: If there is no further discussion, we will take the next paper, "The Eradication of the Tick in the South," by Dr. E. I. Smith.

(Dr. Smith read his paper, which will be published later.)

THE PRESIDENT: The next paper is by Dr. Harry Morris, of Baton Rouge, on "Some Carriers of Anthrax Infection."

(Dr. Morris read his paper, which appeared in the JOURNAL for March, 1920.)

THE PRESIDENT: This paper is open for discussion.

DR. EICHHORN: It is very interesting, no doubt, to those who have anything to do with anthrax control, the many avenues and methods by which this disease may be spread, and I think we are now more enlightened as to how to guard against the different manners of infection.

With regard to the assertion of Dr. Morris about dangers of infection from bovine vaccination, I am of the opinion that at times it may cause death of the animals vaccinated; nevertheless the benefits accruing from the vaccines are so many that we must not lose sight of the benefits which come from this bovine vaccination. As pointed out, the old vaccines placed on the shelf for weeks, months or a year become absolutely inert, and naturally a more effective product had to be sought, and this anthrax vaccine had to be developed. I believe it is necessary to exercise greater precautions in handling anthrax vaccines, but from my own experience I do not think it is possible to start any outbreaks of any consequence from vaccination; that is, if the animals should die from the result of vaccination, the disease will not become virulent. This has been proven by many workers abroad.

I personally believe that in the distribution of any anthrax product precautions must be exercised, and I am sure that the manufacturers would readily accept any proposition by which these products may be effectively controlled; but I want to point out that it would be harmful to make it possible that the product should not be easily accessible to the users; that is, if an outbreak occurs, not too much red tape should be placed in the way of those who want to obtain it immediately.

THE PRESIDENT: Are there any further remarks or discussions? If not, we will call for the next paper by Dr. Burson, on "Some Observations on Veterinary and Live-Stock Conditions in the South."

DR. W. H. BURSON (Athens, Ga.): Mr. Chairman, I would suggest that, as my paper does not contain anything especially technical and a good deal of ground has been covered by other papers on the program, it be read by title only. I have already turned the paper over to Secretary Mayo with that in mind.

(The motion was seconded and carried. Dr. Burson's paper will be published later.)

THE PRESIDENT: The next paper is by Dr. Bishopp, on "Insects and Their Relation to the Production of Live Stock and Poultry."

DR. F. C. BISHOPP (Dallas, Tex.): Mr. President, I would suggest that my paper also be read by title.

(Dr. Bishopp's paper was called for, and he read it. It will be published later.)

THE PRESIDENT: You have heard this interesting paper. Are there any remarks or discussion?

This concludes the program. Has any member any business that he wishes to bring before the Association before its adjournment? If there is no business, the next duty is the installation of the newly elected officers.

I wish to express my appreciation to the members for their attendance and for what seems to me to have been a very interesting session. I have attended a good many meetings of this Association, and I believe that the attendance today at this hour in the program is one of the largest that I have ever witnessed.

INSTALLATION OF NEW OFFICERS

THE PRESIDENT: I will proceed, if there is no objection, to the installation of the President, and I will ask Dr. Cotton and Dr. De Vine to escort the President to the Chair. (Applause.)

DR. CARY, I have the very pleasant duty to inform you that you have been elected as President of the American Veterinary Association and that you are about to assume the responsibilities of that office. We are mindful of the great service you have rendered in the South to this Association, and to the country at large through your professional work. I bespeak for you the same co-operation and support of the Association that it has given its Presidents in the past. It is a distinguished privilege to hand you the gavel of this Association, the implement symbolic of your office, and with other officers now retiring to return to the ranks of the work, to do our part, that your administration may be the most successful, the brightest and the best in the history of the Association. (Applause.)

DR. CARY: Members and visitors: I would be most ungrateful did I not recognize or appreciate the honor you have conferred upon me, and I wish to say to you here, one and all, that I am most

thankful to you for it, and hope that I can measure up, in a degree, with my predecessors.

I want you to understand, all of you, that I hope to be, and shall try to be, President of all the organization, all of the American Veterinary Medical Association, that I want to extend to you an invitation to help make the next year the best and the largest in the history of this Association, not for me, but for the Association, and let our motto be, to elevate, push forward, to rise up, to improve, everything that will improve and advance our profession in this country and in all countries. I shall strive with all my might and main to have this motto before me—the Association and its advancement. I shall strive also not to use any personal preferences or dislikes or anything of that kind in my work. I simply want to interfere in no way with the progress of the Association and to help in every way its advancement.

It is needless for me to use up words or multiply words in thanking you, because I realize you all know that from the bottom of my heart I thank you for this honor; but I shall thank you more if, at the end of my administration, we have accomplished something, and it will be done largely through your work and not through mine. I know that no president or chairman can do anything without the help of the individuals of the organization. It is utterly impossible. Therefore I beg for your help and hope you will all put your shoulders to the wheel and push things forward in a way that we have never worked before. Let our old prejudices and dislikes and old fights be laid aside. Let us make this year, this coming meeting at Columbus, the banner year of the organization. Again let me thank you.

I will ask the Secretary to call the names of the Vice-Presidents for installation.

DR. MAYO: The Vice-Presidents are: Capt. Gould, Dr. Eichhorn, Dr. Flower, Dr. Watson, Dr. Cooley.

PRESIDENT CARY: I will ask Dr. De Vine and Dr. Cotton to bring these gentlemen to the front. They don't seem to want to come to the front without assistance.

(The Vice-Presidents were escorted to the front amid applause.)

PRESIDENT CARY: Members of the Association, we want you to look upon and observe the men who are to help and work with us. (Addressing the Vice-Presidents) I want to inform you, gentlemen, that I am going to call on you for help, and if you don't respond, we will send the officers after you. I want you to consider yourselves duly installed as Vice-Presidents of the American Veterinary Association. (Applause.)

It may not seem necessary, but probably is the custom, to install the Secretary, and I presume it is my duty. He is already in office, but I presume, if you will get a speech out of him, we will consider him duly installed. Therefore we will call for Dr. Mayo to install himself with a speech. (Applause.)

DR. MAYO: Mr. President and members of the Association, I

am very grateful to you for the honor that you have again conferred upon me, and I will try to give the Association more efficient service the coming year than I have in the past. I certainly shall do everything within my power to make the administration of our new President a successful one in every way. I want to thank you also for the assistance that you have given me in the past. I know it will be extended also in the future. (Applause.)

PRESIDENT CARY: I am informed that the Treasurer-elect, Dr. Jacob, is not here, but he has been installed and we will declare him in office for the succeeding year.

We are about to close this meeting for the year. Is there any business, unfinished or new, to come before this organization at this time? If, so, let us have it.

DR. HALL: I don't want to take your time more than just a moment, but I have talked to quite a number of men, particularly to the members of the Executive Board and to the former editors, Dr. Fish and Dr. Dalrymple, in regard to adding a board of editors, with the present Editor as editor-in-chief, to the JOURNAL. I believe that would lighten the work of the editor-in-chief and would serve, incidentally, two purposes in doing that. In the first place, it would enable us to select a board of men who are experts in various veterinary topics to whom papers could be referred and thereby save the editor-in-chief a great deal of time. In the second place, it would place upon those men the task of seeing that papers were submitted to the JOURNAL in their lines. That is the way in which the best medical journals are conducted, and it serves two purposes. It not only gives a critical reading, which enables us to select the best papers and preserve them, but it also serves the purpose of securing abundant material, and there are times, according to our former editors, when it has been necessary to publish practically anything that was submitted in order to fill the JOURNAL. Naturally, we don't want the JOURNAL filled in that way if we can fill it in a better way, and I believe that the suggestion should be kept in mind by the officers and acted upon, whenever it is constitutional or permissible, at an early time. I think, in that way, we can fill our JOURNAL up and make it a more efficient organ of the Association. (Applause.)

PRESIDENT CARY: I wish to say in this connection that it would be necessary to have an amendment to the Constitution and By-laws prepared and put before the Association next year.

DR. MAYO: If Dr. Hall will make a motion to change that section of the Constitution and By-laws so as to provide for an associate board of editors, it can then be acted upon at the next meeting, otherwise it will require two years.

DR. HALL: I will adopt Dr. Mayo's suggestion and put that in the form of a motion. I move you that we change the Constitution and By-laws to cover it.

(The motion was seconded and carried.)

PRESIDENT CARY: This motion to amend the Constitution and

By-laws will be prepared in full and in writing, and submitted to the Executive Board for action at the next meeting.

Is there anything else to come before this meeting before it is closed? If not, a motion to adjourn is in order.

Adjournment.

REPORTS OF RESIDENT SECRETARIES

NEW YORK

One of the most urgent duties of a Resident State Secretary is to procure new members. I must confess that I was very much surprised when I checked up the list of nonmembers of this great body of veterinarians in New York State. As far as I know, a letter and an application have been sent to all these eligibles, and I was also surprised at the few returns received. I will not say that these veterinarians are not progressive, but I will say that they are very careless and do not realize the great benefit that would come by being associated with such a scientific body, the greatest of its kind in the world.

Never in my time have the services of the qualified veterinarian been in more demand than at present in regard to the development of the live-stock interests, and it should not be handicapped by any action, political or otherwise. The great State of New York should be a leader. Those in authority should use all means at their disposal to foster the live-stock industry to its fullest capacity. My opinion is that a great mistake was made when the agricultural law was amended—and I believe that other progressive States that have the live-stock industry at heart, so to speak, think the same also—in placing the State Bureau of Animal Industry in charge of a layman, known as a director. It was a retrograde movement to the veterinary profession in this State. I care not what the qualifications of a man may be, he is not competent to fathom out the problems that are constantly coming up, that live stock are heir to, unless he has received the necessary education of a qualified veterinarian. One to fill this position must be an investigator and also possess executive ability. There are veterinarians in this State who can fill such a position with honor and credit; then why put a layman in charge? How absurd it is, at least to my way of thinking, to have a man dictate along lines that he is not familiar with. I do not blame a layman for accepting the position, but I have no hesitancy in criticising the law, because I believe that politics are at the bottom of it. If this procedure is right and proper, why should a man learned in law be placed at the head of the legal department, why an engineer at the head of an engineering department, or an architect at the head of that department; why not have them all laymen? To my way of thinking, it is two men doing one man's work.

The veterinarian is the guardian of the health of the live-stock, and such being the case, naturally interested in production, and it is up to him to familiarize himself with all the problems

that live-stock are subject to. For that reason, to be associated with a great scientific body like this is an asset to him and is a duty he owes his clients.

The Legislature has authorized \$100,000 towards the completion of the New York State Veterinary College at Ithaca. Of this amount \$30,000 has been appropriated, the remainder of the authorized amount to follow; plans and specifications have been prepared and work commenced. By this enlargement the facilities of the college will be greatly improved. An amphitheater which will accommodate 300 persons will be one of the improvements. This will be greatly appreciated by members of the profession in the State and visitors who will attend the annual conferences which have become so popular. Under present conditions "standing room only" is a very common occurrence.

I have failed to get any statistics of the prevalence of infectious and contagious diseases in our State, but sheep and swine have greatly increased in numbers; the bovine slightly decreased, but greatly increased in value. The veterinary general practitioner is the one to make it possible for the producer to make breeding a success. There are only a few of our clients who are able to employ those who specialize in diseases of breeding animals, so it is up to the veterinarians who are more interested in general work to become more proficient in this line.

With the increase of sheep and swine, diseases peculiar to them are developing. We must increase our knowledge in regard to protecting their interests, get in touch with whatever literature possible, that is worth while, remembering our duty.

Garbage feeding is popular, due to the slogan, "Save food—don't waste it," consequently hog cholera has become prevalent, but the hog raisers have their herds immunized and that places the losses at a minimum. To show the amount of serum used just in our State, the New York State Veterinary College at Ithaca sent out for the year ending June 30, 1919, 538,420 mils, and no doubt many breeders use serum from other laboratories.

I am looking forward to the time when our investigators will give us something to think about in regard to abortion. That is the disease dreaded today by those who are interested in breeding live-stock. Our clients are constantly asking about this and that preventive. They see advertisements regarding them. Biological laboratories are popping up like mushrooms. Is the wastebasket the place for some of this literature? When will the craze stop? Something ought to be done.

It is absolutely necessary that we should have a supply equal to the demand and when that is brought about, high cost of living is going to be reduced. It is the duty of every one who is in any way connected with production, no matter in what line that may be, to stop, look and listen, act intelligently, and not be led by persons who have not the best interests of the country at heart. This is a very large country and it is capable of raising and furnishing any

of the products that are necessary to sustain life. Our population is increasing and must be fed and clothed, but as we are increasing they should be thoroughly Americanized. It is a crime that our number of illiterates is so large. To make our country a better country to live in, the English language should be more compulsory. The foreigners who come to our land and desire citizenship should understand our language, and to understand that our country is only big enough to have one flag, and that one is the Stars and Stripes, and we veterinarians as educated people should take it upon ourselves to lend a hand and do our duty in this line.

The time is coming when those of us who have not looked forward to the time of reverses, that will surely come, and not formed the thrift habit, are going to be somewhat inconvenienced. To live within one's income is a slogan that would be beneficial for every one to follow, and by so doing business would be greatly simplified.

In the last few years the practice of the veterinarians has greatly changed, due to the motor vehicle, so that it has been necessary for them to take up new lines of thought. That which is the most greatly needed is service. A man to be successful in any line of business or profession, must render efficient service. That is what the public wants today. He must study his clients, as there are no two alike, and live an honorable life, which is the duty he owes himself, family, profession, clients and community.

W. G. HOLLINGWORTH,
Resident Secretary for New York State.

WEST VIRGINIA

During the past year we have not had any serious outbreaks of animal diseases of any kind. We have had a number of cases of hog cholera and swine plague, but our farmers in many sections of the State have learned by experience the value of vaccinating and are doing a great deal of this and have been able to hold in check what might have been more serious losses. The same may be said as to blackleg, for which they have been using the vaccine and preventing outbreaks on infected pastures. Several cases of hemorrhagic septicemia have been reported, also a number of rabies outbreaks, but a strict quarantine soon checked their spread without very serious loss of stock, but I am sorry to say a number of people were bitten and were required to take antirabic treatment. The other diseases, as strangles and shipping fever, were of no serious importance. Our farmers and stockmen are beginning to understand more fully our live-stock sanitary laws and thus are preventing losses that a few years ago were given but little attention, and that prophylaxis is far better than treatment later.

Our State has, with many of the others, co-operated with the Bureau of Animal Industry in the accredited-herd list for the eradication of tuberculosis from our purebred and dairy herds. We have a long list of applicants on the waiting list for the first test, and many herds have been tested so far. But I am very sorry to

report that I am informed that in a number of herds which had been tested and passed the Federal veterinarians are finding from 50 to 90 per cent of reactors. However, this can be very readily accounted for when we learn, as I am informed, that the registered veterinarian making the test would leave the stable man to take the temperatures and then after the injection of the tuberculin would turn this work over to the stable man or an empiric or anyone to take the temperatures and he would come around later and check up and give a clear chart O. K. In this same section of the State the same system was worked in interstate shipments, but this veterinarian, I am informed, has been caught in this deal. There is only one solution and only one way that this can be corrected—that is by his charts not being accepted. If we are ever to get our herds clean we must have the very best, and the veterinarians to do this work on the square and show no favorites. They must stay on the job and see that the temperatures are correctly taken and the symptoms of the cattle observed at the time of making the test, which can not be done by the layman. As far as I can see, there is only one way we will ever reach the goal in eradication of tuberculosis from our herds; that is by co-operation with the Bureau of Animal Industry, for then we know there will be no favorites. We hope by another year to have this work well under way and with the number already passed the first year the rest should be easy sailing.

One of the consulting veterinarians was forced to make one arrest of a person violating a quarantine. He found reactors in this herd and before he could have them condemned and slaughtered as per regulation the owner sold the cattle. Needless to say a conviction was made and a fine of \$50 and costs imposed. This will have quite a weight in helping to let the public understand what the State sanitary law means when it is applied to tuberculin cattle and reactors found.

I regret that I have been able to secure but few new members for the A. V. M. A. this year, when we should have at least one dozen.

Very respectfully submitted,

S. E. HERSHEY,
Resident Secretary of West Virginia.

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Wisconsin, H. Lothe, Waukesha.
Wyoming, B. Davis, P. O. Box 355, Cheyenne.

NOTES FROM THE SECRETARY'S OFFICE

President C. A. Cary has appointed Dr. L. E. Day, of Chicago, a member of the Committee on Intelligence and Education, to succeed Dr. Kiernan, who has resigned.

The Secretary has received inquiries from former members of the A. V. M. A. who have dropped out, some of them for a number of years, and they wanted to know on what terms they could be

reinstated. As a number did not want to come in again as new members, this matter was referred to the Executive Board, and they have ruled that former members can be reinstated upon the payment of \$5 back dues, and \$5 due for the current year. A letter will be sent out to a large number of those who have dropped out in the past few years, advising them of this ruling.

The Secretary's office has just sent out the final statement to those who have not paid their dues for the current year. Unless a prompt remittance is made, their names will be dropped from the list of active members, and also from the subscription mailing list of the JOURNAL. All members who have not paid their current dues of \$5 are urgently requested to send it in at once, as it will save the Secretary's office, as well as the Editor's office, a large amount of work.

According to all reports received from Ohio, the local committee, as well as the veterinarians of the State, are making splendid progress for the arrangements of the A. V. M. A. meeting at Columbus. An attendance of two thousand veterinarians is expected, and the local committee is planning to give them a royal good time. Every member should make his plans now to attend this meeting, which promises to be one of the most important and interesting ever held by the Association. Bring your wife, if you have one. If you haven't, get one before that time.

Dr. C. H. Stange has been elected chairman of the Executive Board of the A. V. M. A.

N. S. MAYO, *Secretary*.

TREASURER'S REPORT

EVERY member of the A. V. M. A. should look over carefully the excellent report of Dr. Jacobs in the February number of the JOURNAL and note how the funds of the Association have been handled and expended.

On page 537 is one item of \$73.71 paid to me for which there is no explanation. This was evidently an oversight. This amount was for traveling expenses attending the Southeastern Veterinary Meeting at Birmingham, Alabama, at the request of President Moore, and is the only traveling expense incurred by the Secretary.

N. S. MAYO.

OTHER ASSOCIATIONS

MISSOURI VALLEY VETERINARY ASSOCIATION

THE Missouri Valley Veterinary Association held its mid-annual meeting February 10, 11, 12, 1920, at Kansas City, Missouri. About three hundred veterinarians, many of whom were accompanied by their wives, were in attendance.

A number of exceedingly valuable contributions were offered, and an unusually good clinic, on the third day of the meeting, was well attended. Among those papers presented were the following:

"The Kansas Horse Disease in the Arkansas Valley of Colorado (1919)," by O. B. Morgan. Dr. Morgan discussed the outbreak of this disease during the summer of 1919, showing that it was probably identical with the outbreak observed in Kansas and adjacent States in 1912. He recommended the use of large doses of such purgatives as aloes and Epsom salts in conjunction with large quantities of water, both administered by means of a stomach tube. Oral medication in any other way was condemned as dangerous on account of the pharyngeal paralysis existing. Under such treatment the percentage of recoveries was 61.2.

Dr. G. A. Johnson read a paper on "Veterinary Publicity" in which he suggested various means of enlightening the public as to the ways in which the veterinary profession might be of service, and acquainting it with the many recent advances made in veterinary science. He advocated participation in civic affairs to the end that the veterinarian might become a figure of prominence in his community. He recommended the contribution of articles to local publications along lines which concern the public health and welfare, the whole basis of such efforts being that of giving service.

Mr. G. A. Breon read a very interesting paper entitled "The Relation of the Veterinary Supply House to the Practitioner." He makes the statement that the modern veterinary supply house is honestly endeavoring to serve the veterinarian in every possible way, and to safeguard his interests, but that probably all of them make mistakes through the fallibility of human nature, and through faulty information obtained from those from whom they receive orders. He cited a few concrete cases to show that veterinarians themselves may be responsible for occasional mistakes, particularly in supplying goods to laymen in the belief that they are serving qualified veterinarians. He made a plea for co-operation in the

elimination of undesirable customers, particularly nonlicensed veterinarians.

Among the most valuable papers offered was one by Dr. W. H. Welch, on "Successful Horse Production of the Future." He brought to our attention some very important and new ideas concerning the future of horse breeding. He called our attention to the fact that a tractor on the farm is an impractical and unprofitable machine unless the farming be done on an extensive scale, that the tractor's life is only about 4 years; that its fuel must be imported; that it leaves no progeny and returns nothing to the soil in the way of fertility. While the tractor does not get sick and die, it often does get sick and requires the services of a skilled mechanic, and replacement of broken parts, which in the end cost the owner more than hospital bills for his horses.

Dr. D. F. Luckey, under the head of "Hemorrhagic Septicemia," reported several cases, the diagnosis of which should have been very simple, but which were diagnosed hemorrhagic septicemia by the veterinarian. Among these cases were those of animals suffering from parasites, azoturia and hog cholera. In a separate paper Dr. Luckey discussed the proper dose of tuberculin, emphasizing the fact that animals in which large doses of tuberculin are employed for diagnostic purposes are so saturated with the agent that subsequent reactions are impossible, and thus many dangerously diseased cattle may be pronounced sound. He says there is no exact standard upon which a diagnosis may be made, as much depends upon the previous history, type of animal, etc., and reactions must be judged largely by the use of common sense. He therefore recommends the smallest possible dose of tuberculin, and retesting within 90 days, as the best means of cleaning up tuberculous herds. He has found the ophthalmic test may show reactors when other methods have failed.

Dr. C. D. Folse read a paper entitled "A Few Facts in Connection with the Use of Simultaneous Virus in the Field." This paper may be summarized as follows: Serum made in a licensed plant is potent at the time it leaves the plant; virus made in a licensed plant is virulent at the time it leaves the plant; virus may lose its virulence as a result of fluctuating temperatures at which it is stored, and is generally employed in too small a dosage to insure a correct reaction.

Dr. H. E. Curry read an interesting paper detailing the method used at the Kansas City Stock Yards for immunizing stock hogs.

He also gave figures showing the growth of this work, and its importance to the hog industry. The conditions under which hogs are handled following immunization and shipment are very important factors in the health of the stock, and buyers are given directions as to how they should be handled to prevent loss, and requested to fill out report forms giving data as to the condition of the animals after arriving on the farm. Many cases of loss were shown to be due to unfavorable weather, improper housing, and bad sanitation generally. Bacterin treatment is administered to many animals, which seems to reduce largely the cases of swine plague or infectious pneumonia.

Dr. W. E. King presented some valuable light on the question of the bacterial count in vaccines and its relation to the question of immunity.

Dr. H. A. Hoffman reported the occurrence of malignant edema in swine received from certain localities, following the injection of serum or virus. Numerous animals in the same lot showed up the infection following the use of different lots of serum, and it was evident that the infection was not from this source. Cultures made from skin scrapings confirmed the belief that the infection was carried by the needle through the skin from the superficial layers.

Mr. E. M. Boddington gave some very interesting information on the various State laws which affect the serum industry, showing that in many cases the legislation is purely for revenue or the protection of local producers and in no way beneficial to the hog producer.

Dr. F. Proescher presented a very able paper supplemented by photomicrographs dealing with his studies in hog cholera and bronchopneumonia. This work has been under way for 2 years, and if confirmed by further study and investigation on the part of others will revolutionize the serum industry. Dr. Proescher has isolated from filtered virus 2 organisms, 1 of which he calls the hog-cholera organism, the other the *Bacillus bronchiosepticus*. These are exceedingly minute, the former measuring about 0.1 micron, the latter about four times this size. Both have been cultivated artificially, each producing characteristic lesions and death. These cultures have also been used in producing hyperimmune sera with the usual protective value of anti-hog cholera serum. Neither, however, is capable of producing a product which will immunize against the other. He therefore looks upon so-called hog cholera as being either pure hog cholera, pure bronchopneumonia, or a

mixture of the two, and believes that breaks following vaccination may be due to the monovalent nature of the product used for immunizing. He welcomes full investigation of his work, and it is hoped that by another year other investigators may have confirmed his discovery.

Dr. A. R. Ward detailed studies which he has made in infectious keratitis or pinkeye of cattle. He spoke particularly of the extreme difficulty in obtaining sufficient material for laboratory examination, owing to the sensitiveness of the eye. In his examination of inoculated rabbits, he was surprised to find the hemorrhagic septicemia organism localized in the eye.

Dr. C. E. Salsbery presented the results of investigations on bovine infectious metritis. He supplemented this with drawings of the normal and diseased uterus, showing the changes which occur in cases of endometritis. His observations fit very nicely into the experience of the practitioners who discussed the matter.

Dr. J. F. De Vine was the special guest of the Association, and gave a full discussion of breeding problems of the dairy herd. His work in this line is well known, and his talk was immensely appreciated by all those in attendance. He also gave some interesting demonstrations in the clinic on the third day of the meeting.

Other papers offered, which were read by title only on account of shortage of time, were: "One Cause of Abscess in Vaccination of Hogs," by Dr. B. H. Brooks; "Some Swine Diseases as Seen in the Field," by Dr. P. T. Smith; "Infectious Ophthalmia of Cattle," by Dr. S. L. Stewart; "Meat Inspection," by Dr. W. Parker; "Preparation of Specimens of Laboratory Examination," by W. G. Keehn; "Diagnosis and Treatment of Impaction of the Floating Colon," by Dr. H. E. Kingman.

The clinic on the last day of the meeting included a large number of cases in horses, cattle, sheep and swine. Special emphasis was given to the autopsying of swine suffering from various diseases and to the treatment of sterility in cows. A delightful luncheon was served to the veterinarians and the ladies by the Kansas City Stock Yards Company, who also provided the live-stock pavilion for holding the clinic. Resolutions expressing the appreciation of the Association were adopted.

The banquet on the night of the eleventh was well attended, and a very interesting and entertaining program was rendered.

Dr. D. F. Luckey, State Veterinarian of Missouri for many years,

was the recipient of a brand new Ford sedan, the gift of the various deputies of the State.

Twenty-four members were added to the roll, and the meeting was generally pronounced a great success. The next meeting will be held in Omaha, Nebraska, in July.

R. F. BOURNE, *Secretary,*
Fort Collins, Colo.

ALABAMA VETERINARY MEDICAL ASSOCIATION

THE thirteenth annual meeting of the Alabama Veterinary Medical Association was held at the Veterinary College of the Alabama Polytechnic Institute, Auburn, Alabama, February 26, 27 and 28. This meeting had two distinct subjects up for discussion.

First, tuberculosis with special reference to tuberculin testing, and second, abortion with its allied diseases.

The ophthalmic tuberculin test was presented by Dr. R. S. Sugg; the intradermal test by Dr. I. S. McAdory and the subcutaneous by Dr. J. R. Sullivan. Early, normal and delayed tuberculin reactions were graphically presented by Dr. C. J. Becker, Federal veterinarian in charge of that work in Alabama. Combination tuberculin tests were presented by Dr. L. B. Ernest from the Bureau Office at Washington. Following these papers the discussion involved the whole subject and the technical points affecting a test were brought out distinctly. At the same time there were carried on tests on about eight cattle in the Veterinary Department with the three different methods and combined methods. At the present writing only one of the reactors has been destroyed and postmortem records made. One peculiar thing was brought out in a reacting Holstein bull. Up to the present this bull has reacted some eight to ten times to the ophthalmic test and each time he has given a marked reaction. How many times he will react remains to be seen.

Another thing brought out was accuracy and completeness of tuberculin records in interstate health certificates. Drs. Ernest and Becker conducted a sort of school of instruction, giving out blanks, having these filled in by the veterinarians present and then criticised. This was valuable to the practising veterinarians present.

The causes of abortion were brought out by Dr. C. W. Ferguson; diagnosis of infectious abortion by Dr. I. R. Pollard; the retention of placenta in cows by Dr. J. S. Andrade; treatment of acute metritis in cows by Dr. W. D. Staples and treatment of sterility in cows by Dr. E. D. King. After these papers had been read they

were discussed and some lively discussions were presented. From the various papers and discussions it seemed that the profession is somewhat at sea as to causes, modes of infection and treatment. There seem to be a few things that are fairly well established and they are that infectious abortion should be treated in a manner after other infection, as well as embracing removal of infected placenta or other materials, cleanliness, and to a limited degree, disinfection. The question of immunity or the production of immunity by artificial means seems to be unsettled.

Following this Dr. H. C. Wilson read a brief paper on the differential characteristics of hog cholera, swine plague, etc., and led a general discussion on the methods of handling hog cholera. The discussion was very much like that which goes on at most of these meetings. The next paper was one on the treatment and prevention of intestinal parasites in swine by two senior students of the College, Murray and Neal. The tests they had made were with oil of chenopodium and santonin. The results obtained were very good and the methods used were fully described.

On Friday night the Students Veterinary Medical Association entertained the State Association at a banquet. This was very enjoyable and the banquet speeches were not the least enjoyable part. On Saturday morning, a polyclinic was held at the Veterinary College and various operations and diagnoses were made. Among them were diagnosis and operation of a strangles abscess in the superior cervical lymph gland in a mule, an operation for umbilical hernia in a pig, several cases of lameness, a case of roaring, and also in the morning one of the reacting tuberculous cows was killed at the city slaughter house and the veterinarians present had the advantage of seeing a postmortem inspection.

In the main this was one of the most profitable and instructive association meetings ever held by the Alabama Veterinary Medical Association. The association adopted an emphatic resolution endorsing the movement to reorganize the Veterinary Corps in the United States Army and get it on a professional basis.

Dr. W. D. Staples, of Anniston, Ala., was elected President.

C. A. CARY, *Secretary*.

VETERINARY ASSOCIATION OF NEW YORK CITY

THE regular monthly meeting of the Veterinary Medical Association of New York City was called to order by President MacKellar at 8:30 p. m., February 4, in Carnegie Laboratory. Secretary Crawford

being absent, on motion Dr. R. W. Gannett was made secretary pro tem. The minutes of the January meeting were read and approved.

Dr. Augustus S. Downing, Assistant Commissioner and Director of Professional Education, University of State of New York, spoke on the veterinary profession, its shortcomings, needs and appurtenances. Lack of professional spirit among veterinarians toward the integrity of the profession, was considered by Dr. Downing to be a most serious shortcoming. Illegal practice as a rule does not disturb the veterinarian so long as he is not personally and financially concerned. He voiced in no uncertain language his disapproval of the practice among certain veterinarians of employing an unqualified and unlicensed assistant to practice. The state does not hesitate to revoke the licenses of dentists who thus violate the law and will at the proper time take action against certain practitioners who disregard the law and are disloyal to their profession.

Dr. Downing spoke of the need in the rural sections of the state for the trained veterinarians who would fit in. He felt that there was a rare opportunity for service for the young graduate trained in the diseases of farm animals and willing to work. Loyalty to the profession, love for animals and a desire to serve the community are characteristics much to be desired and encouraged in the young man who takes up the veterinary profession.

In the discussion which followed Dr. Downing disapproved of proposed legislation which would allow any veterinarian who was honorably discharged from the army to practice in New York. He said that such a person should at least be passed upon by the Board of Examiners.

He took issue with Dean Hoskins in the matter of college entrance requirements. Said that ours was a profession and not an occupation, but that as long as certain ones continue to preach low-grade men and low college entrance requirements they could not expect that good men would be attracted to the profession.

Dr. William Herbert Lowe believed that Dr. Downing struck the keynote when he said that the profession needed more men. However, Dr. Lowe was not in favor of reducing educational requirements. He said veterinarians were needed who were intimate with the problems of the stock raiser and able to counsel with and advise him, especially along the line of increased production. He thought something might be done to attract graduates of agricultural colleges to the veterinary profession.

Dean Hoskins spoke of the languishing animal industry, especi-

ally sheep raising. He stated that there were less than 400 new students in all the schools in America which were too few to meet the growing needs of the country. He thought something should be done and that the four-year high school entrance requirements did not meet the situation, as there were only 5 new students at New York University, 41 at Cornell, and 10 at the University of Pennsylvania. He spoke of the valuable work done by the so-called low-grade veterinarian such as the stamping out of foot and mouth disease, the work on Texas fever, and contagious pleuro-pneumonia, the creation of the Bureau of Animal Industry, etc. He said that 70 per cent of membership in the A. V. M. A. was from short-term schools. The Dean pleaded for the boy who was educated in the habits and life of farm animals, but was too busy to obtain the required four-year high school preliminary education.

Dr. Downing, in closing, said that our high school graduates must be made acquainted with the opportunities in the veterinary profession. He said that his experience has been that with any profession the number of students dropped off temporarily when entrance requirements were raised. He stated that we must not take a backward step toward the "hoss doctor" of 30 years ago. That 30 high grade, well trained men were worth more to animal industry than 300 inferior men who might be capable of doing a good deal of damage.

On motion, Dr. Downing was given a vote of thanks.

R. W. GANNETT,
Secretary Pro Tem.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

THE Thirty-seventh Annual Convention of the Pennsylvania State Veterinary Medical Association was held in Harrisburg, Pa., on January 19 and 20, 1920, at the Penn-Harris Hotel and House Caucus Room of the State Capitol.

There were several very interesting papers read, among which were the following:

"Some Observations Made in General Practice," by Dr. H. E. Bender, Lititz, Pa.

"Ruminatorics in Impaction and Atony of the Rumen," by Dr. L. A. Klein, Philadelphia, Pa.

"Scope and Policy of the Bureau of Animal Industry, Pennsyl-

vania Department of Agriculture," by T. E. Munce, Harrisburg, Pa.

"Sterility and Abortion Work," by Dr. Cassius Way, Brooklyn, N. Y.

"Tuberculosis Control in Pennsylvania," by Dr. Samuel E. Bruner, Pennsylvania Bureau of Animal Industry, Harrisburg, Pa.

"Differential Diagnosis of Hog Cholera," by Dr. Edward A. Cahill, Indianapolis, Ind.

"Hog Cholera with Special Reference to Differential Diagnosis," by A. Eichhorn, Pearl River, N. Y.

"Hog Cholera Control," by Dr. R. M. Staley, Harrisburg, Pa.

The meeting was well attended.

The following were elected officers: President, Dr. H. E. Bender, Lititz, Pa.; Treasurer, Dr. Thomas Kelly, Philadelphia, Pa.; Corresponding Secretary, Dr. R. M. Staley, Harrisburg, Pa.; Recording Secretary, Dr. C. S. Rockwell.

C. S. ROCKWELL,

Recording Secretary.

COLLEGE OF VETERINARY SCIENCE OF THE STATE COLLEGE OF WASHINGTON

A POST-GRADUATE course for veterinarians was recently held at the College of Veterinary Science of the State College of Washington, covering a period of six days.

The program was carried out without change and was well received by all in attendance.

We were especially fortunate in having with us Dr. John F. McKenna, of Fresno, Cal., to aid with the program and he gave us some very interesting lectures. Doctors Robert Prior, of Yakima and H. A. Trippeer, of Walla Walla, also aided us materially with the program, making it especially interesting and attractive.

Dr. Menig's paper on a new milk fever treatment was very complete and opened an entirely new field for progress along this line of work.

The surgery of Drs. McKenna and Beckmann was very interesting and well performed.

The entire program, in fact, was a great success and was attended by about twenty veterinarians from Washington, Oregon, California and Idaho.

E. E. WEGNER, *Vice Dean.*

COLORADO VETERINARY MEDICAL ASSOCIATION

THE semi-annual meeting of the Colorado Veterinary Medical Association will be held Wednesday, May 26, at Fort Collins, followed on Thursday and Friday by the first practitioners, short course given by the Colorado Agricultural College. This course is given on the request of the Colorado Veterinary Medical Association and is beginning with only a two-day session. We are promised the services of Dr. W. L. Boyd, of St. Paul, Minnesota, who will discuss sterility and abortion. We are in correspondence with other men of national reputation whom we expect to have present.

I. E. NEWSOM, *Secretary*.

NEVADA STATE VETERINARY ASSOCIATION

THE second annual meeting of the Nevada State Veterinary Association was held at the Riverside Hotel, Reno, January 9, 1920. Following a banquet, there was informal discussion of live topics of interest to all present.

This association is urging the establishment of municipal meat and milk inspection for the city of Reno. At present there is no systematic inspection of these products used in the city.

The next meeting will be held in Reno, April 9, 1920.

The newly elected officers are: President, Robert Dill, Reno; Vice-President, George E. Bamberger, Reno; Secretary-Treasurer, Lewis H. Wright, Reno.

L. H. WRIGHT, *Secretary*.

VETERINARY CONFERENCE AT PURDUE UNIVERSITY

A one-week veterinary conference was held at Purdue University, LaFayette, Indiana, from February 16 to 21. Dr. T. H. Ferguson, of Lake Geneva, Wisconsin, and Dr. E. T. Hallman, of the Michigan Agricultural College, East Lansing, Michigan, were the two principal speakers at the conference.

The veterinarians of Indiana who availed themselves of the opportunity to hear these men and see their demonstrations, will not soon forget the many good ideas given them by Dr. Ferguson and Dr. Hallman. This is the second time the Extension Department has had Dr. Hallman in Indiana. The splendid impression made by both the Doctors cause us to hope for another opportunity to bring them back to Indiana.

L. C. KICIN,
Extension Veterinarian.

NATIONAL ASSOCIATION OF B. A. I. VETERINARIANS

OUR Third National Convention is scheduled to be held in conjunction with the 57th Annual Session of the A. V. M. A. at Columbus, Ohio, beginning August 23, 1920.

All our national officers have mutually agreed to attend the Convention on annual leave and not to charge the Association for any part of their Bureau salary during that trip.

This arrangement has been perfected in the belief that in thus conserving the funds of the National Association, our organization will be in better shape, financially, to do more effective work in our campaign of publicity.

Our National Executive Committee now appeals to all subordinate Associations to arrange to have their delegates to the Columbus Convention donate their time to the Association during that trip, conserving the funds of the subordinate Associations and making more money available for use in conducting the work of publicity.

If all delegates donate their time to the Association it is believed that in many cases subordinate Associations can arrange to be represented at the Convention by regular delegates rather than by proxies, and it is very essential to the genuine success of the Convention that the greatest possible number of regular delegates be in attendance.

S. J. WALKLEY, *Secretary*.

METROPOLITAN DIVISION B. A. I. VETERINARY ASSOCIATION

THE annual meeting of the Metropolitan Division of the Bureau of Animal Industry Veterinary Association was held in New York on April 5, 1920, at which the writer was elected President in place of Dr. J. D. De Ronde, who has ably held this post and rendered valuable service since the organization started.

This meeting was the best attended and the most enthusiastic ever held by our organization, due, no doubt, to the great incentive our new Secretary of Agriculture has given us and more especially to our Chief and the Chairman of our Legislative Committee, who have shown their interest in our welfare and loyalty to Bureau veterinarians.

We now have great leaders and let us back them up to the limit, both morally and financially if needed. I appeal to all B. A. I. veterinarians, especially those not affiliated at present, to get into the nearest local organization and applaud our deeds, and not in silence suffer an adverse faction to gain sway.

Our National President Townsend was present and outlined in detail the great good he purposes to accomplish with the help of us all, and from my knowledge of his loyalty and determination I am confident that what he purposes he will perform.

The Classification Committee did not treat the veterinarian as it should, but from what we hear from the front we believe this error will be rectified and we will be placed where we belong, with other scientific employes; but it is incumbent on each veterinarian to push all the time and we will acquire a great momentum which will show results.

Be ready at all times to interview influential persons in our behalf if called upon to do so.

All New England Bureau veterinarians are invited to affiliate with our association until such time as they form their own local organization.

LELAND D. IVES, *President*.

Dr. Charles P. Schneider, of Indianapolis, has been placed in charge of virus-serum control work of the Bureau of Animal Industry at Sioux City, Iowa.

Dr. Thomas J. Ahern, Buffalo, N. Y., and Dr. Walter W. Shartle, Indianapolis, Ind., have been assigned to the federal force of tick eradication at Birmingham, Ala.

The force of tick eradicators at Fort Worth, Texas, has been increased by the assignment of government veterinarians as follows: Dr. Earl L. William from Buffalo, N. Y., and Dr. Jesse L. Shabram, Dr. Walter C. Alvey, Dr. Francis A. Pickett and Dr. Rudolf F. Krenck from Kansas City.

Dr. James E. Shelton, of Arkansas City, Kansas, has been transferred and placed in charge of Federal meat inspection work at Waterloo, Iowa, vice Dr. Walter C. Bower, resigned. Dr. Shelton will be succeeded at Arkansas City by Dr. Frank E. Haworth from Fort Worth, Texas.

Just as we go to press the sad news is received of the deaths of Drs. Joseph Hughes, President, Chicago Veterinary College, and S. E. Cosford, in charge of Bureau field work in Nebraska. Biographical sketches will appear next month.

COMMUNICATIONS

INTERNATIONAL VETERINARY CONGRESS

DEAR DR. EICHHORN:

Since writing to you I have called a meeting of the committee for the Tenth International Veterinary Congress, the committee being still officially in existence.

As you know, the question of where the next Congress should be held, can only, by Constitution of the International Congress, be decided by the Permanent Commission, upon which the United States has representatives. The committee felt that they could not express a definite opinion on the question of holding the next congress in the United States until the Permanent Commission—which I understand requires reorganization—had met.

Of course, it will be quite understandable to you that we in this country, and in France and Belgium, have many wounds which are not by any means healed. The committee thought, however, that it would be impossible to take the attitude that an International Congress could be held, without that congress really being international. They thought, moreover, that it would be impossible to hold any congress in which the various belligerents would have to meet each other, not only scientifically, but socially, for a period of three or four years. Having regard to my past experience in organizing an international congress, I doubt if it could be properly done under three years.

A letter has been sent to Dr. DeJong, who expressed doubts as to his own position, asking him to call a meeting of the Permanent Commission, as at present constituted, to consider future congresses. That request practically means that in this country, whatever our personal feelings are, we do not think it practicable to have any international congresses which do not include every nationality.

Whether the French and Belgians will look at the question in this way we cannot, of course, tell, but it will be up to DeJong now, as Secretary of the Permanent Commission, to find out what the feeling is in the various countries.

If I may offer you advice personally of what I gather as regards Europe, I would say that none of the nations concerned are likely to take up a congress for some years. Some individuals have suffered enormously, and the cost of living has hit practically all professional men to such an extent that it is doubtful if many could be

found ready to pay the cost of a visit, such as would be entailed by a visit to the United States. It is even doubtful if some of the governments would willingly send representatives, having regard to the public cries for economy.

All these things considered, I rather think that a congress in the United States at such an early date as you suggest would be very badly attended, not in the least because international veterinarians would not like to visit your interesting country, but because they would find the expenses a burden.

May I express the hope that if the next congress is held in the United States, the exchange will be a little better from Europe's point of view, and that if it is not, you will at least have converted the "dry" people, so that we will be able to get some consolation.

Yours sincerely,

STEWART STOCKMAN.

APPEAL IN BEHALF OF PROFESSOR HUTYRA

To the Editor:

Realizing the fact that the name of Professor Hutyra is known to almost every veterinarian in the United States and that through his splendid Textbook on Special Pathology and Therapeutics of Domestic Animals the English veterinary literature has been enriched by one of the most valuable literary contributions, it seems to me that it would be of interest to the profession to learn of the state of affairs which exists in Hungary, where Hutyra has been so active in veterinary education, by publishing the following letter which I have just received from him:

BUDAPEST, Feb. 5, 1920.

VII., Rottenbiller-u. 25.

MY DEAR DOCTOR EICHHORN:

Due to the tremendous depreciation of the value of our money, as well as to the very sad financial situation of our suffering country, it is impossible at the present time for our college to order foreign veterinary periodicals and publications. On the other hand, we feel the necessity of familiarizing ourselves with the literary contributions which have appeared during the years we were isolated from the foreign countries, in order that they may become available to the members of our profession and for laboratory work.

Under this condition, I take the liberty of requesting you to assist us in interesting the publishers of the JOURNAL of the American Veterinary Medical Association and possibly also those of other veterinary periodicals in our cause, so that they may send us the journals and if possible that all back numbers from 1915 be

sent to us in order to complete our files. I can assure you that as soon as conditions will warrant it, we will again regularly subscribe for them. Besides we would be very much obliged if you could assist us in obtaining reprints of any publications on veterinary and allied subjects.

I received the bulletins on hog cholera which were kindly sent to us by the Bureau of Animal Industry and please express to the authorities my heartiest thanks for this kindness.

As I have learned that the second edition of our Special Pathology and Therapeutics has made its appearance in the English language in the United States, we would be very thankful if we could receive a set of the same. At the present time the fifth German edition is in the press and will be ready within a few weeks. It contains very important changes, especially in the volume on organic diseases and in general the new edition is very much amplified.

At the beginning of the world war, being a Hungarian my name was stricken as a member of the Société Centrale de Médecine Vétérinaire and possibly also from the list of the Belgium Academy. I am very much interested to learn whether I can still consider myself a member of the American Veterinary Medical Association of America.

Assuring you beforehand of my heartiest thanks for your efforts and requesting you to extend to my colleagues my highest respect, I am, with very kind regards,

Very truly yours,

PROFESSOR HUTYRA.

Those who participated in the memorable veterinary tour of the American Veterinary Medical Association in 1914 have not forgotten the wonderful, charming personality of Hutyra, as he endeared himself to all those with whom he came in contact on that occasion. He is truly a great man, a credit to the veterinary profession, and has always commanded the respect and love of every veterinarian. It is a pitiful state of affairs that he is now obliged to appeal for publications which might be of value to himself, his co-workers and also to the veterinarians of a destitute country.

Knowing the broad generosity of the veterinarians in America, I am convinced that those who will read the appeal will have sympathy for Hutyra, and if there should be any hatred against those who were instigators in bringing on the great world calamity, no one can have any resentment against a man of Hutyra's type.

Those who have had the privilege of attending the International Veterinary Congresses have observed that the leaders of the veterinary profession of all countries have always gathered around Hutyra, with whom social, as well as professional, intercourse was a revelation. I have freshly in mind my visit to the International

Congress at Budapest in 1905 when in company with our late beloved Leonard Pearson, the greatest of American veterinarians, I spent many hours with Professor Hutyra. It was indeed inspiring to a young veterinarian, as I was at the time, to observe these two great minds discussing veterinary problems, and a remark to me by Dr. Pearson is still fresh in my mind when he stated that, of all the leaders of the veterinary profession, Hutyra is the foremost.

It is not my intention to eulogize this great man, but I simply deemed it necessary to make these remarks as an introduction to an appeal which I am making to the veterinary profession of America for small contributions toward a fund which will enable one of the oldest veterinary colleges to purchase and obtain publications in order that they may keep in touch with the work which is being carried on throughout the world. I also appeal to those who have reprints of their publications available which appeared since 1915, that they either send them directly to Professor Hutyra or to me, and I will be pleased to forward them to him. Those veterinarians who desire to make a financial contribution may send it to me and I in turn will be pleased to transmit it to Professor Hutyra.

I am primarily prompted in making this appeal by my desire to assist a most noble-minded veterinarian in order to enable him to continue to serve his profession as he has in the past. His contributions to veterinary science are of international value and I am certain that those who will bear this in mind will not let their generosity be influenced by any hatred which they may have had for the countries with which we were at war.

Very truly yours,

Pearl River, N. Y.

ADOLPH EICHHORN.

[Dr. Eichhorn has well stated the intimate fraternal feeling which is manifested for Professor Hutyra by all veterinarians who have enjoyed the pleasure of his presence. As no action has ever been taken, nor even contemplated so far as we know, by the A. V. M. A., to remove Hutyra from its membership, his name is still on the honorary list, and it will be a pleasure to replace it on the mailing list. Unlike some veterinarians of continental Europe, Hutyra has always shown broad vision and a sympathetic attitude towards the struggles and achievements of the veterinary profession of America. His kindness and helpfulness can now be partly repaid by his American colleagues, by forgetting all political and military issues and taking prompt action on the appeal of Dr. Eichhorn.—EDITOR.]

population of America.

L. A. MERILLAT.

DOGS AND SHEEP

To the Editor:

It occurs to me as it has to Dr. Hoskins that the American Woolen Company and the other dog haters who would restore the sheep industry to its former status by trouncing upon the dog would do well to determine just how big a factor the sheep killing dog has been in causing the decline, and it would be interesting to know just how much they have studied the other harmful influences that have operated to this end and what measures have been taken to correct them also.

It seems evident that the campaign against the sheep killing dog is fostered by other motives than that of restoring the sheep industry for one could hardly believe that serious-minded men would pin their faith in this movement as a remedy. What these motives are is not germane to the point at issue but it seems that our idiotic systems of taxation (grabbing where the grabbing is good) is not the least important among them. Furthermore, the natural dog hater who would eliminate this domestic animal from the face of the earth on any plausible pretext is ever ready to champion the cause of the sheep man to further his unjust ends. And we must not forget the zealous sanitarian who would tax the dog out of existence as a carrier of disease. All of these working unconsciously or consciously together find little opposition before our very respective legislators. That the money collected is diverted into other channels I would not dispute with one as experienced with our system of government as Dr. Hoskins but I do know that some of this money goes toward paying for dead sheep *some of which were killed by dogs*.

From many inquiries among farmers of Illinois and Ohio I have yet failed to find a single one who discontinued the raising of sheep for this reason. While I do not assert that none such exist they are certainly few. Sheep were once used to feed off roughage that now goes to the dairy cow, the cheap hill pasture is now under intense cultivation and is too valuable for sheep, and the clearing and woods into which sheep were turned to browse the underbrush while the stumps rotted preparatory to cultivation no longer exist. Hence the farmer on the small farms has gradually turned away from sheep raising as an absolute necessity.

I believe like Dr. Hoskins that the veterinary profession should see that the dog and dog owners get a fair deal and not allow the will of a small organized minority to prevail over the large dog-loving population of America.

L. A. MERILLAT.

MISCELLANEOUS

CIVIL SERVICE EXAMINATIONS

THE United States Civil Service Commission announces open competitive examinations for veterinarian and lay inspector, Grade 1, on June 9, 1920. Vacancies in the Bureau of Animal Industry, in the position of veterinarian at \$1,500 a year, and in the position of lay inspector, Grade 1, at \$1,080 a year, and vacancies in positions requiring similar qualifications, at these or higher entrance salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Appointees whose services are satisfactory may be allowed the temporary increase granted by Congress of \$20 a month.

The scope and character of and requirements for the veterinary examination are as follows:

Competitors will be examined in the following subjects, which will have the relative weights indicated, on a scale of 100: (1) Veterinary anatomy and physiology, 25; (2) Veterinary pathology and meat inspection, 30; (3) Theory and practice of veterinary medicine, 30; (4) Education, training, and experience, 15.

The applicant must show that he has graduated from a veterinary college of recognized standing or that he is a senior student in such an institution and expects to graduate within six months from the date of the examination. Certification of senior students who attain eligibility will be withheld until they furnish evidence of actual graduation.

The questions may include any subject of an accredited veterinary college course, e. g., anatomy, physiology, chemistry, materia medica, therapeutics, meat inspection; the etiology, pathology, symptoms, and treatment of diseases of domestic or food-producing animals, etc.

Application Form 1312 is required for this examination.

TEST FOR ARMY HORSES

A thirty-mile race over the neighboring country of Virginia with a view to determining the type of horse best suitable for military purposes will be one of the interesting features of the National Capital horse show and military racing meet to be held May 18-22 at Arlington Park, Virginia, across the river from Washington, D. C.

It is certain that a large number of the younger officers of the army stationed in and about the Capital will participate in the event, many of them having already started to get their animals ready for the ride. Those in charge of selecting horses for cavalry and artillery purposes for the United States Army will watch keenly the outcome of the race.

Gen. John J. Pershing and Gen. Leonard Wood, who are vice-presidents of the National Capital Horse Show Association, have always been keenly interested in the raising of the standard of the horse for military purposes. This attitude on the part of the higher officers cannot help but make the test a bitterly contested one.

The race will be started from the grandstand at Arlington Park. The course will be laid out as much as possible along the Potomac River and over those roads least frequented by automobiles. The finish will be in front of the grandstand. The judges will include the best authorities on horseflesh in the Government. It is expected that the military attachés of all of the foreign embassies and legations will watch the event with as keen an interest as that of the United States Army officers.

ADMINISTRATIVE POSITION IN AGRICULTURAL FIELD FOR ANOTHER VETERINARIAN

IT is with great satisfaction that the veterinary profession should receive news of the ability of its members being recognized outside the ranks and activities of the strictly veterinary field. Such a recognition is here reported in the appointment of C. M. Haring, well known member of the A. V. M. A. and its former secretary, to membership on the administrative committee of the University of California, College of Agriculture.

This is one of the largest stations in the United States and the administrative work has been too great to fall entirely on the shoulders of the Dean and Director. The policy has been adopted, therefore, of having a directing head for each of the main subdivision of the work, namely, Resident Instruction, Research, and Agricultural Extension, and Dr. Haring will become the Director of Research of the experiment station.

He has been connected continuously with the University since his graduation from Cornell in 1904, except for eight months spent in travel in Europe and one year in the Veterinary Corps of the United States Army. Since 1910 he has been head of the Division of Veterinary Science.

G. H. H.

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No. 3

A CURE-ALL FOR MAN AND BEAST

THE Food and Drugs Act has done much to discourage the purveyors of food frauds and fake remedies, yet there is need for constant vigilance on the part of Federal and State officers. Reports of prosecutions show that there is a perennial crop of optimistic and enterprising individuals who are willing to take a chance with the law. Among them are food economists who seem unwilling that anything should be wasted even though spoiled, and who believe in making sawdust do the work of more nourishing substances. There are those also who label stock feeds in a way calculated to deceive the confiding cow into believing that she is getting more protein and less crude fiber than her ration really contains. Others are actuated by a burning ambition to relieve suffering humanity (of its dollars), and some go so far as to include the lower animals in their beneficence.

A nostrum for nearly every ill of man or beast was recently brought to light among some cases reported by the Bureau of Chemistry of the United States Department of Agriculture. This wonderful preparation, according to the printed matter which accompanied it, was a remedy and cure for neuralgia, rheumatism, pneumonia, lung troubles, asthma, coughs, pleurisy, backache,

burns, headache, flux, all bowel complaints, sore throat, catarrh of stomach or bowels, consumption and kidney troubles, as well as for blind staggers, distemper, glanders, fistula, poll evil, bighead, bigjaw, sweeney, blackleg and hog cholera. Just how the versatile proprietor came to overlook abortion, spavin, hollow horn and bots is more than we can comprehend.

This marvelous universal specific was marketed under the name of "Gregory's Antiseptic Oil." Its composition is no longer a secret. Analysis showed that the principal ingredient was kerosene oil (89 per cent), with the addition of small amounts of oil of cloves, oil of cassia, oil of sassafras, and a trace of camphor and pepper resins. Presumably the latter ingredients were put in for the two-fold purpose of disguising the kerosene smell and supplying the pungent odor which the psychology of antisepsis requires—since the average layman has no confidence in an antiseptic which doesn't smell like one. Whether there is any connection between this preparation, which was marketed by a firm at Little Rock, Ark., and the oil booms in the neighboring States of Oklahoma and Texas, we are unable to state.

Lest our readers be tempted to prescribe kerosene oil (under its Latin name, of course, and accompanied with other disguises) for all the ailments in the catalog, we hasten to add that the Federal officials charged that the Gregory preparation was not, in truth and in fact, an effective remedy as represented. The defendant pleaded guilty, and a compassionate court imposed a fine of \$50.

AN OPPORTUNITY

LET us seriously note for a moment what the Dean of Medicine, University of Michigan, recently advised the Congress of Medicine in session at Chicago. It is of vital concern to veterinarians inasmuch as it is so powerfully suggestive and contains a prod which strikes deep into the medical profession and gives us an opportunity to reflect upon whether or not we are racing too fast.

The Dean commented upon the lack of knowledge of preventive medicine by graduates and practitioners in general, further stating, for his conclusion, that the average run of physicians are unfitted—unprepared to furnish protection to public health. An examining board, of which he was a member, found that candidates for license to practice medicine were well equipped in the subjects of surgery and curative courses, but were failures when examined on preventive measures.

All the teaching in the universities, he remarked, is in the direction of cure; very little is stressed on the field of prevention, in spite of the old adage that "an ounce of prevention is worth a pound of cure." According to the foregoing it appears that there is a tendency to rush to the extreme in an almost frenzied search for a specific biological preparation, every energy being directed toward some great discovery that will add to the curative armamentarium to be used with the minimum effort.

It is an undisputed fact that the study of biologics is along approved and wise lines, but after the laboratory has turned out the product to the great mass of physicians of human and veterinary medicine there remains a tempting opportunity to make a guess, followed with the careful technique and skillful maneuver of the hypodermic needle. In an emergency case, it is true that the demand of the average patient is immediate action, regardless of condition before or after.

How many of us remember when the Spanish influenza suddenly fastened its grip upon us that the most sane and safe thing to do, to combat further outbreaks, was to take several treatments with a bacterin containing in suspension a high count of *Bacillus influenzae*, streptococcus, pneumococcus, *Micrococcus catarrhalis* and *Staphylococcus pyogenes aureus* and *albus*. The writer took it and had occasion to observe others who acted likewise; the results were not startling and the question arises whether or not the action of the bacterin may have been chiefly psychological.

The study of biologics cannot be neglected any more than the course in therapeutics or materia medica can be relegated to the old-fashioned past. They must be balanced in the scales of practical medicine in order that the student may finally have due regard for both. As we are now going, the doctor of the future will need only to bring the army of serums and disease together and leave one to inflict defeat upon the other.

The study of preventive medicine requires time and labor equal to the mastering of therapeutics and materia medica and involves, above all, a detailed knowledge of bacteriology, which again turns the wheel around to the subject of biological products.

As veterinarians, we have a tremendous responsibility resting upon us and a brilliant opportunity to identify ourselves with a project to make the world better from a physical standpoint, to the end that the average longevity of man may be materially increased.

E. I. S.

TUBERCULIN TEST FIGURES BY BREEDS

THE relative freedom of a herd of cattle from tuberculosis depends on the kind of management the herd receives rather than upon a resistance inherent in the cattle themselves. This conclusion, applying to 14 recognized breeds of cattle in the United States, is based on a study of official tuberculin-test records for nearly half a million animals. As a basis for answering inquiries regarding the prevalence of tuberculosis in various classes and breeds of cattle, the Bureau of Animal Industry has compiled all of its test records since the beginning of tuberculosis-eradication work. The results, though capable of receiving many interpretations, fail to show that any breed can be considered safer from tuberculosis than another. Of 30,670 Hereford cattle tested in purebred herds, the percentage of reactors was unusually low—only 0.77 per cent. But in grade herds of the same breed the percentage of reactors was 5.11. In the Aberdeen-Angus breed the experience was reversed. Purebred herds showed 5.79 per cent of reactors, compared with 2.39 in grade herds. Among the Shorthorns 5.75 per cent of tuberculosis was found in purebred herds and 3.74 per cent in grade herds, about 77,000 animals being included in the computations.

Although it has been frequently asserted that dairy cows, by reason of closer housing, have more tuberculosis than beef cattle, the official figures fail to support that assumption. In some dairy breeds the percentages of reactors were relatively high, but in others the percentages were low. Likewise in dairy herds, as with beef cattle, there was little uniformity between the proportion of reactors for purebreds and grades representing the same breed.

Briefly, the figures indicate that the freedom of a herd from tuberculosis is influenced chiefly by the efforts of the owner to keep the herd healthy, not by the breed. Some breeders' associations have been noticeably active in encouraging their members to adopt tuberculosis-eradication measures. The figures are believed to reflect such activity.

Furthermore, the compilations disprove the assertion, sometimes made, that purebred herds are more susceptible to tuberculosis or have more of it than grade cattle. In fact, the highest percentage of tuberculous cattle in any group was for grades.

"Whale meat has been officially classified as fish and not meat. Since the only man who really had inside information on the subject has been dead a long time, the question has been the subject of considerable controversy."—*Western Farm Life*.

ULCERATIVE LYMPHANGITIS OR "PREISZ-NOCARD DISEASE" OF HORSES, WITH ESPECIAL REFERENCE TO IMMUNE SERA, TOXIN AND ANTITOXIN¹

By CAPTAIN E. A. WATSON, *Department of Agriculture, Canada.*

TERMINOLOGY

OWING to some confusion of terms in denoting contagious or infectious forms of lymphangitis of the horse, it seems well to explain that the term "ulcerative lymphangitis," as used in this paper, is intended to cover only those forms of disease originating in infection with the bacillus of Preisz-Nocard.

Possibly the term is not a good one. The disease manifests itself in varying morbid pictures according to location, virulence, and manner of evolution. In many cases it is neither an ulcerative nor a lymphangitic process. But even so, ulcerative lymphangitis is the term used by Nocard, who discovered the bacillus causing the disease in horses, said to be identical with the bacillus found earlier by Preisz in the kidney of a sheep in a case of pseudotuberculosis (caseous lymphadenitis). The disease in horses has since been generally known and described under this term; but latterly, and especially during the war, the term has come to include a group of pathological conditions of more or less mutual clinical resemblance but differing widely in etiological factors.

Belin (1) proposes a division of forms of contagious lymphangitis of the horse into two groups:

1. Epizootic lymphangitis of mycotic origin, subdivided into (a) cryptococcic and (b) sporotricotic.

2. Ulcerative lymphangitis of bacterial origin, subdivided into (a) bacillary, (b) micrococcic, (c) staphylococcic. To this there might be added (d) streptococcic, a lymphangitic infection described by several French and American writers as ulcerative lymphangitis. Whatever designation is followed, it would appear well to include in or with it as clear an indication as possible of the main etiological factor of the disease; thus, "ulcerative lymphangitis (Bac. Preisz-Nocard)," or simply, and perhaps better, "Preisz-Nocard disease."

Preisz-Nocard disease attacks most of the species of domesticated animals; in horses as ulcerative lymphangitis, purulent nephritis, pustular dermatitis or furunculosis, not to mention rarer forms of

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

the disease; in sheep and cattle as caseous lymphadenitis, caseous broncho-pneumonia, pyelonephritis, etc.

The prevalence of the disease among the army horses and mules in France, Belgium, Italy, Egypt, Palestine, Mesopotamia, and in fact, in all theaters of the late war, and the enormous losses caused by it in mortality and inefficiency, have given it a place of first importance and called for much work and investigation on the part of the various veterinary corps engaged.

INFECTIVITY AND PERIOD OF INCUBATION

Experiments were conducted with a view of determining the degree of infectivity and the period of incubation of ulcerative lymphangitis.

Thirty horses were selected free from any evidence or suspicious sign of the disease and which had not been in contact with any known case or source of infection for at least 3 weeks prior to the experiments which followed.

1. Twenty of the horses were placed alternately with 20 known cases of the disease, each presenting typical open ulcers, and left in contact for 48 hours. They were then removed to a new standing and isolated there for 6 weeks. Only 1 of these 20 animals developed the disease. This one had received a slight injury on the hock from the kick of another animal during the 48 hours' contact. On the seventeenth day following, and near the site of the injury, a typical lesion was presented; a few days later another one appeared close by.

2. Six horses were selected presenting a slight wound or injury of the skin acquired in the stables and not of very recent origin. The injury, in each horse, was smeared with a pus swab taken from a typical lesion presented by each of 6 diseased horses. It was shown by microscopical examination and cultures that the pus swab used in each case was infected with Preisz-Nocard bacilli. In this way infection was transmitted to one of the six selected horses, the first abscess and ulcer developing in 25 days.

3. Four horses were selected in each of which a slight wound in the skin was artificially made with the point of a scalpel and immediately rubbed over with an infected pus swab. Infection was transmitted to 3 of the 4 horses. The first abscess and ulcer appeared in 7, 14 and 24 days respectively, and from each lesion the Preisz-Nocard bacillus was recovered.

Thus, intervals varying between 7 and 25 days elapsed between

infection through a broken or injured skin and the development of the first typical lesion. Between this and subsequent lesions such as multiple ulcers or chronic thickening of a limb, the periods are very uncertain and irregular. The disease may evolve rapidly, but more often it is a slow, insidious, recurrent process. Nothing is known of the mode of infection in those atypical or hidden forms of Preisz-Nocard disease, such as nephritic abscesses, mentioned by the author in a previous report (2).

Knowing the variability of the virulence of different races of Preisz-Nocard bacilli, as shown by inoculations of guinea pigs, even longer periods of incubation than those indicated in the above experiments may be expected to occur in nature.

PATHOGENICITY FOR GUINEA PIGS

The wide variation in virulence of different races of Preisz-Nocard bacilli of equine origin is shown in the 3 examples following.

1. A male guinea pig is inoculated intraperitoneally with 0.5 c.c. of a 48-hour culture. A marked orchitis develops on the fourth day; death occurs on the seventh day. Postmortem examination shows numerous minute pus nodules and granulations on the liver, spleen and abdominal viscera and a purulent inflammation of the testicular coverings. This example may be considered as one of ordinary virulence.

2. An example of high virulence: Inoculated as above with a different race of bacilli; death occurred under 24 hours. Post-mortem examination showed acute peritonitis and minute flakes and white granules scattered among the abdominal viscera.

3. Low virulence: Slight orchitis and death in 6 to 7 weeks. Pus foci in abdominal lymph glands and caseous nodes.

Several laboratory races of Preisz-Nocard bacilli subcultured for many months became quite avirulent for guinea pigs.

Some inoculations in horses also indicated that the virulence of races of Preisz-Nocard bacilli was of a very unstable character.

IMMUNIZATION

The following attempt to confer an immunity to the Preisz-Nocard bacillus, antibacterial and antitoxic, was made with a view of obtaining a serum which could be serviceably employed for the treatment of ulcerative lymphangitis. The experiment covers a period of 470 days and is divided into three stages: (1) attempted immunization, (2) further immunization, (3) immunity and

anaphylaxis. The results and developments which took place in the course of this experiment are of interest and afford a ground for discussion.

The subjects were 3 normal horses recently cured of mange. The material inoculated, consisting of whole cultures altered by heat or chemical solutions, the toxic filtrates of unaltered cultures, and virulent bacilli, and the dosage, time and manner in which these were given, were approximately the same in each case up to the end of stage 1. Stages 2 and 3 apply only to the animal surviving stage 1.

First Stage—Attempted Immunization

1st day.—Subcutaneous injection of 2.5 c.c. of heated culture (65° C., 30 minutes). Slight local swelling, 48 hours.

5th day.—Injection repeated as above. Similar local reaction.

20th day.—Subcutaneous injection of 2.5 c.c. of an unaltered virulent culture (0.05 c.c. kills guinea pig in 5 days). Small single abscess (Preisz-Nocard bacillus) in each case, healing within 10 days without further developments.

35th day.—Subcutaneous injection of 10 c.c. of heated culture (65° C., 30 minutes). Local swelling, 48 hours.

60th day.—Intravenous injection of 5 c.c. of a weakly carbolized culture (0.5 per cent carbolic acid). No visible reaction.

90th day.—Subcutaneous injection of 20 c.c. of weakly iodized culture (1-10 volume of Gram's solution). Large abscess; 1 liter of pus (Preisz-Nocard bacillus, pure) on twelfth day. Dried and healed rapidly.

120th day.—Subcutaneous injection of 50 c.c. of toxin (filtrate of bouillon culture). Diffuse edematous swelling. Rise of temperature to 103° F.

130th day.—Subcutaneous injection of 100 c.c. of toxin. Edema and rise of temperature to 103° F., as before.

156th day.—Intravenous injection of 40 c.c. of heated culture (60° C., 1 hour). Depression and off feed for 2 days. Temperature rise to 102.5° F. Blood taken before injection furnished a serum strongly inhibitory to growth of Preisz-Nocard bacillus and anti-toxic.

180th day.—Intravenous injection of 75 c.c. of heated culture (56° C., 1 hour). Depression and slight temperature rise. Serum inhibits growth and neutralizes toxin.

187th day.—Intravenous injection of 40 c.c. of very weakly carbolized culture (0.2 per cent carbolic acid). Very slight reaction.

195th day.—Serum inhibits growth and neutralizes toxin. Intravenous injection of 50 c.c. of virulent culture. Urticarial edema on the fourth day. Many boils appeared in 7 to 10 days, giving pure cultures of Preisz-Nocard bacillus. Stiffness and lameness in limbs and joints. Rapid failing in condition.

Two of the horses developed multiple abscesses and were destroyed when in a dying condition, within 21 days. Postmortem examination showed generalized infection including renal abscesses which gave pure cultures of Preisz-Nocard bacillus.

The third horse, which had developed a furunculosis (Preisz-Nocard pus), was also very ill indeed but seemed to be making a better resistance, and efforts were made to save him. The skin lesions were washed and dressed and an immunizing treatment given as follows:

Second Stage—Further Immunization

210th day.—Subcutaneous injection of sensitized vaccine, 10 centigrams of dried Preisz-Nocard bacilli emulsified in saline solution and added to 25 c.c. of specific serum.

219th day.—Subcutaneous injection of 25 c.c. of specific serum.

222d day.—Subcutaneous injection of 50 c.c. of specific serum.

224th day.—Subcutaneous injection of 10 centigrams of dried bacilli in 50 c.c. of specific serum.

234th day.—Much improvement in condition. No fresh lesions.

255th day.—Normal condition. Serum completely inhibits growth of Preisz-Nocard bacillus. Subcutaneous injection of 10 centigrams of bacilli in 10 c.c. of specific serum.

260th day.—Subcutaneous injection of 15 centigrams of dried bacilli in 15 c.c. of specific serum.

275th day.—Subcutaneous injection of 15 centigrams of dried bacilli in 15 c.c. of specific serum.

300th, 325th and 350th days.—Subcutaneous injections of 15 centigrams of dried bacilli. Serum is antitoxic and inhibits growth of Preisz-Nocard bacillus. Employed as a specific treatment for ulcerative lymphangitis of the limbs in a series of 25 horses, it met with a varying success—rapid improvement followed in some cases by a relapse.

Third Stage—Immunity and Anaphylaxis

402d to 410th day.—Daily subcutaneous injections of 10 centigrams of dried bacilli. Occasionally a small pus node, negative for Preisz-Nocard bacillus, would form at point of injection.

430th day.—Five liters of blood drawn for serum collection.

450th day.—Five liters of blood drawn for serum collection. Intravenous injection of 15 centigrams of dried bacilli.

457th day.—Five liters of blood drawn for serum.

460th day.—Intravenous injection of 20 centigrams of dried bacilli. Severe shock, apparently anaphylactic, immediately followed. Return to normal in a few hours.

463d day.—Much depression. General weakness. Refuses food.

465th day.—Symptoms of toxemia. Weakness or paralysis in hind limbs. An acute, purulent inflammation in the anterior chambers of the eyes.

468th day.—Paralysis and semicomatose condition. Blood examination showed intense leucocytosis. Cultures of the jugular blood gave pure growth of Preisz-Nocard bacillus.

470th day.—Death. Postmortem: General signs of toxemia. Acute carditis; congested lungs, liver, spleen and kidneys. No abscesses or pus formation anywhere except in the anterior and posterior chambers of the eyes. The aqueous and vitreous purulent fluids, also the heart blood, gave pure cultures of Preisz-Nocard bacillus which proved very virulent for guinea pigs, having fatal results in from 18 to 48 hours.

Summary of Results and Remarks

In the first stage of the experiment a serum was obtained which inhibited the growth of the Preisz-Nocard bacillus in culture and protected the guinea pig against fatal doses of toxin. Even so, the horses furnishing this serum were themselves unable to resist the intravenous injection of a large dose of virulent culture, which caused a generalized infection in all three animals and fatal results in two of them.

In the second stage of the experiment the surviving horse recovered normal health and condition under a course of treatment with sensitized vaccine and furnished a serum antitoxic, and to some extent antibacterial, in action. On horses suffering from the disease this serum seemed to have a marked effect, the local lesions healing up rapidly; even so, after some weeks relapses were apt to occur with this as with any other form of treatment tried.

In the third stage of the experiment an attempt was made to raise the degree of immunity, and especially the antibacterial rather than the antitoxic immunity. Only killed or altered bacilli, treated with alcohol-ether mixture and dried in vacuo as prepared by Truche (3), were employed as antigen. Following upon a number of injections and several blood-lettings an anaphylactic state was suddenly encountered, in which, so it would appear, there was manifested the sudden activity of Preisz-Nocard infection which must have been dormant for at least six months, possibly anchored by the specific receptors of the tissue cells or held in check by the inhibitory action of the serum. Breaking away during the anaphylactic state, the infection took a rare form of evolution. The bacilli, invading the blood-stream, caused there an intense leucocytosis, but in no part of the animal body exercised their habitual and characteristic local action of pus formation except in the bloodless fluids of the eyes. Instead of being chronic the disease was very acute and produced a rapid septicemia, intoxication and death. No similar case of

Preisz-Nocard infection of the horse producing a fatal septicemia or toxemia, or in which the bacilli have been found circulating in the blood-stream or causing a purulent inflammation within the eyes, appears to have been recorded.

One may note in this case the late appearance of the anaphylactic condition, on the four hundred and sixtieth day of the experiment, the close association of immunity and anaphylaxy and the rapid transition from the former state to the latter; also the exalted virulence of the bacilli as shown by their adaptation to the blood-stream and aqueous humours, their active proliferation in these fluids, and their high degree of toxicity.

SPECIFIC PROPERTIES OF ANTI-PREISZ-NOCARD SERUM

In the course of the foregoing experiment the serum of the horses immunized was examined for antibacterial and antitoxic properties.

Antibacterial Action

The Preisz-Nocard bacillus, which grows exuberantly in normal horse serum, would not grow in the serum of immunized horses. Normal serum makes the most suitable culture medium for this bacillus. The serum may be added to bouillon, to peptone water or to saline solution, or used pure in an unaltered and undiluted state. All that is necessary to note the inhibitory action of specific serum *in vitro* is to inoculate two tubes of sterile liquid serum with given quantities of a suspension of Preisz-Nocard bacilli. One tube, the control, contains normal horse serum, the other contains the serum to examine. Incubate at 37° C. and examine for growth in 12 and in 24 hours. A rich, granular growth, characteristic for the Preisz-Nocard bacillus, occurs in normal horse serum but not in an anti-Preis-Nocard serum. Titration of the serum is carried out in a series of dilutions in bouillon or suitable liquid culture media.

Another method for observing the inhibitory action of the serum is to prepare two sterile cells on a glass slide, the one containing a drop of normal serum, the other a drop of antiserum. Each cell is inoculated with a very small loopful of bacillary suspension, sealed with a sterile vaselined cover-glass and incubated. Microscopical growth can be seen in the normal serum and not in the antiserum, in a few hours. Macroscopical colonies appear in the one and not in the other in 12 to 24 hours.

Experiment for Comparing Antibacterial Action of Serum in Vitro and in Vivo.—Two samples of normal horse serum and 2

samples of antiserum were taken. To 1 c.c. of each serum 0.2 c.c. of an emulsion of virulent bacilli was added, in a set of 4 tubes prepared in duplicate (A and B). The two sets of tubes were then incubated. At the end of 30 minutes the 4 tubes of set B were removed and the contents of each inoculated intraperitoneally into 4 guinea pigs. Guinea pigs Nos. 1 and 2, injected with bacilli mixed with normal serum, died, one under 24 hours, the other under 48 hours. Guinea pigs Nos. 3 and 4, injected with bacilli mixed with antiserum, also died, one in 3 days, the other in 5 days. The 4 tubes of set A remaining in incubator were examined in 12, 24 and 48 hours. In tubes 1 and 2, containing normal serum and bacilli, there was rapid and abundant growth. In tubes 3 and 4, containing antiserum and bacilli, there was no growth.

Thus, in spite of its marked inhibitory action *in vitro*, anti-Preisz-Nocard serum exerted but little influence on the virulence of the bacilli *in vivo*, only retarding their pathogenicity for a day or two.

Agglutination.—It seems impossible to make a satisfactory examination of the serum for specific agglutinins. Preisz-Nocard bacilli, even after grinding and shaking, will not remain in suspension. Autoagglutination and flocculent or granular sedimentation invariably occur. Even so, some differences in appearance can be noted. In dilutions of 1:10 up to 1:100 of specific serum the bacilli are agglutinated and sedimented in a heavy mass. With normal serum agglutination is more granular and flocculent, sedimenting more slowly and forming less adherent and less compact masses.

Antitoxic Action

Experiments showed that (a) 1 c.c. of toxin kills a guinea pig of 350 grams weight within 24 hours; (b) 1 c.c. of toxin added to 1 c.c. of normal horse serum also kills a guinea pig within 24 hours; (c) 1 c.c. of toxin added to 1 c.c. of anti-Preisz-Nocard serum is neutralized or fixed and remains inoffensive for the guinea pig.

Repeated with different samples of normal serum and different samples of antiserum, the results always corresponded with the above. Thus, a lethal dose of toxin is neutralized and rendered inert by contact with antiserum. Normal horse serum does not neutralize or fix and affords no protection against a lethal dose.

Samples of anti-Preisz-Nocard serum evaporated to dryness at a temperature not exceeding 50° C., or *in vacuo* over sulphuric acid at room temperature, and tested 18 months to 2 years after their preparation are found to have retained their antitoxic properties.

Ten centigrams (1 c.c. of 1:10 solution) of the dried serum neutralizes a 1 c.c. lethal dose of toxin and affords complete protection for the guinea pig.

The serum of horses chronically attacked with the disease also has specific antitoxic properties. This observation was first made, it appears, by Nicolle, Loiseau and Forgeot (4) and is of especial interest and importance, first, as a factor in the evolution of the disease and as regards immunization and serum-therapy, and secondly, as the basis of specific diagnostic reactions.

Serum Diagnosis.—Forgeot and Cesari (5), in their "toxino-diagnostic" method, inject a guinea pig with a dose of serum sufficient to protect (if antitoxic) against a lethal dose of killed toxic bacilli injected upon the following day.

Watson (6) uses the soluble toxin obtained in the filtrate of liquid cultures, adding a lethal dose of such toxin to a neutralizing dose of serum and, after 20 minutes' contact, injecting the mixture into a guinea pig.

A negative reaction in the guinea pig indicates Preisz-Nocard infection in the animal furnishing the serum. A simple, delicate and specific method of diagnosis is thus available and is of very considerable value in determining latent, hidden and atypical or questionable forms of the disease. It is now employed in connection with army horses returning to Canada from France.

The complement-fixation test has not been studied in this connection. The agglutination test, for reasons already mentioned, is not satisfactory.

With regard to the specificity of the reaction it is of interest to note that Dassonville (7) has claimed that antidiphtheritic serum modifies, retards or paralyzes the action of the toxin of the Preisz-Nocard bacillus. Hall and Stone (8) state that there is partial neutralization of Preisz-Nocard toxin by diphtheria antitoxin. Nicolle, Loiseau and Forgeot (4), however, contradict this in stating that antidiphtheritic serum is as inefficacious as normal horse serum, that neither manifests the least action on the toxin of the Preisz-Nocard bacillus, and that the two toxins, diphtheritic and Preisz-Nocard, differ profoundly the one from the other.

It does not appear that there is any real relationship between the Preisz-Nocard bacillus and *Bacillus diphtheriae*. But, certainly, there are somewhat striking analogies, and the toxins, antitoxins and cultural characteristics of these microbes seem to have many points in common.

TOXIN

Preparation of Soluble Toxin

Some races of the Preisz-Nocard bacillus are virulent, others non-virulent; some produce an active toxin, others do not. Obviously, for the preparation of toxin, it is quite essential to select a race of bacilli recognized by its action on guinea pigs as particularly toxigenic.

Peptonized horse-heart bouillon (reacting +1.5 to phenolphthalein) makes a very suitable culture medium. A cultural characteristic of the Preisz-Nocard bacillus in bouillon is the surface growth in the form of a veil which readily disintegrates and falls to the bottom of the medium. There is also a coarsely granular deep growth at the bottom of the tube or flask. The bulk of the medium remains clear. Some races favor a surface growth, others a deep growth. A race will acquire the habit of an exuberant surface growth after making a few transfers of a fragment of the floating veil from tube to tube at 2- to 3-day intervals. In doing so the fragment is gently lifted from one surface and floated upon the other, taking care not to immerse it in the liquid during the operation. From such a culture—virulent, toxigenic and giving a rich surface growth—large, wide flasks or bottles of bouillon are sown *on the surface* and incubated at 35° to 37° C. In 6 or 7 days surface growth has fully developed, parts of it falling. The bulk of the veil is sunk by gentle agitation and tapping, and in about a week later another surface growth will have formed. Growth has then practically ceased. Little difference, if any, could be detected in the toxicity of filtrates of bouillon cultures incubated 2, 4 and 6 weeks.

Properties

Heated at 58° to 60° C. for 1 hour, the toxin had no action on guinea pigs. At 55° to 58° C. it caused a local edema. Unheated, it caused death in 24 to 36 hours.

By filtration through fine, new Chamberland candles a considerable part of the toxin appeared to be lost. Filtrates obtained through old candles which had been heated to redness and which allowed an easy filtration gave a toxin fatal to guinea pigs in 30 to 36 hours. The supernatant fluids of unfiltered, centrifugated cultures were fatal in 18 to 26 hours in the same quantities.

Chemical Solutions

The addition of carbolic acid or cresol, 0.4 per cent, seemed to cause a rapid deterioration in toxic activity.

Brilliant green, 1:50,000 to 1:100,000, acts as a good preservative and does not appear to have any adverse influence on the toxin.

Method of Preparing Toxin

The procedure finally adopted is to take bouillon cultures 2 to 3 weeks of age, shake them up and then allow them to stand 24 hours or longer. After sedimentation 10 c.c. of the cleared bouillon is centrifuged for about 1 hour and the supernatant fluid tested upon guinea pigs. If 1 c.c. or less kills a guinea pig in 24 to 36 hours it is sufficient evidence of the presence of an active and satisfactory soluble toxin. The culture fluids are then siphoned off into a receiving flask, carefully avoiding the bacterial sediment. A loose cotton filtering plug has been inserted in the siphon tube, which, with the receiving flask, has been previously sterilized. A solution of brilliant green to make 1:100,000 is added and the fluid drawn through a coarse candle direct into a distributing flask from which ampoules or bottles are filled.

Toxin prepared in this manner and preserved for more than one year has not deteriorated to any appreciable extent.

Action on Guinea Pigs

The following is an example of the action of the toxin on guinea pigs:

Toxin No. XXI.—Intraperitoneal injections of 1 c.c. and over caused death within 18 hours; a dose of 0.5 c.c., death in 30 hours; 0.1 c.c., within 48 hours. Subcutaneous injections of doses of 0.5 c.c. and over caused death within 24 hours.

The animal refuses feed and remains huddled up in one corner of the cage. The eyes are nearly closed and, a few hours before death, there is shivering and trembling, more or less loss of consciousness, and sometimes paralysis of the hind quarters. At post-mortem examination there is, if the injection has been made subcutaneously, a local spreading edema, glossy, gelatinous and sometimes hemorrhagic. The abdominal organs are very congested, especially the stomach and small intestines. The kidneys are often intensely congested, also the liver. The lungs show very distinct patches of deep congestion and red hepatization. The upper heart chambers are filled with blood almost black in color. The congested organs have a striking violet or lilac tint, very noticeable if the organs are examined upon a porcelain dish.

Action on Rabbits

The rabbit is very sensitive to intravenous injections of toxin. A rabbit weighing $8\frac{1}{2}$ pounds injected intravenously with 2 c.c. of toxin died within 4 hours. Breathing, at first rapid, became slow and weak; in 2 hours the animal was comatose. The lungs were intensely congested. Intramuscular injections of toxin caused death in 10 to 15 hours. The lungs were intensely congested and multiple hemorrhagic spots covered abdominal viscera.

Action on Horses

The action of the toxin on horses is under investigation. Only a few preliminary observations have been made. Subcutaneous injections into normal horses caused a local swelling to appear after 24 hours, attaining a maximum dimension in about 48 hours. In immunized and in diseased horses a similar local swelling occurred, but in 12 to 18 hours, reduced in 24 hours, and vanished in 48 hours. It would appear that the reaction was later and more persistent in a normal horse than in an immune or in an infected horse, but the observations are too few to permit of any conclusion. Possibly a cutaneous reaction to Preisz-Nocard toxin would be given in ulcerative lymphangitis comparable to the Schick reaction in diphtheria.

As already noted, horses chronically affected with the disease become immunized to the toxin, their serum having a decided antitoxic action. Even so, the disease continues to make progress. Immunity to the toxin, then, does not carry, or does not run parallel with, immunity to the virulence of the bacilli, which continue to exercise a pathogenic power even in the presence of antitoxin.

SUMMARY

There is a high degree of infectivity when opportunity is given the bacillus of penetrating the skin by means of a recently scratched or injured surface.

The interval between entry of the bacilli and the development of the primary sore varied between 7 and 25 days. The intervals between primary and secondary lesions are still more variable, and, at any stage in the disease, long or short periods of tolerance or local immunity are to be met with and expected.

The range of virulence is a wide one. All degrees of pathogenic activity may be noted between that causing (1) an acute septicemia

or toxemia, (2) slowly evolved chronic or recurring purulent and ulcerous processes and (3) one or several isolated abscesses.

Attempts to immunize and hyperimmunize horses were only partially successful. A serum was obtained decidedly antitoxic and to some extent antibacterial, but the horses furnishing the serum eventually succumbed to generalized infections in a more or less acute form.

An active soluble toxin can be obtained in the filtrates of cultures of the Preisz-Nocard bacillus of races specially selected for their virulent and toxigenic properties.

The properties of the serum of diseased horses permit of specific toxin-antitoxin methods of diagnosis.

The experiments and observations noted herein were made, in part, at the Veterinary Bacteriological Laboratory (Army Veterinary Corps), Rouen, France, and, in part, at the Veterinary Research Laboratory (Department of Agriculture), Lethbridge, Canada.

Dr. F. Torrance, Veterinary Director General of Canada, kindly permits the presentation of this paper.

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The Nebraska State Board of Veterinary Medicine will hold its next regular examination June 15th at the State Capitol. For information and applications address Mr. H. H. Antles, Secretary, Department of Public Welfare, Lincoln.

The New Jersey State Board of Veterinary Medical Examiners will meet at the State House, Trenton, N. J., June 25 and 26. Prospective applicants wishing to take the New Jersey examination should apply for application blanks to the Secretary, Dr. J. B. Hopper, Ridgewood, N. J.

A REVIEW OF SEVERAL PUBLICATIONS ON INFECTIOUS ABORTION DISEASE¹

By E. C. SCHROEDER, *Bethesda, Md.*

THE chairman of the Committee on Abortion Disease of the American Veterinary Medical Association recently asked me, as a member of the committee, to prepare a review of the literature of the past year on abortion disease. After considering his request I realized that compliance with it would mean the undertaking of a task which would require decidedly more time than I could afford to give it. But, as I did not wish to send Dr. Eichhorn a flat refusal, I wrote him that I would attempt to prepare a short review of several articles on abortion disease, published since the last annual meeting of the Association, which impressed me as being of exceptional importance, omitting from this review, however, irrespective of their importance, all publications of which members of the Abortion Committee are the authors.

The members of the committee are also active members of the Association, and I am convinced that they themselves are the proper and best agents for the presentation of their work and views on abortion disease, as well as on other subjects in which they may be interested, to the Association.

The first article to which I wish to call your attention was published by Dr. Theobald Smith in the *Journal of Experimental Medicine*² under the title "Spirilla Associated with Disease of the Fetal Membranes (Infectious Abortion)."

It deals with the isolation of a spirillum, in pure cultures, from 14 fetuses aborted by cows. The abortions occurred among animals belonging to a group of herds under one management, with more or less intercourse between the different herds. In the same herds 27 abortions occurred which were found to be associated with the *Bacillus abortus* of Bang. No instance was found in which the two organisms, the spirillum and the bacillus, were present in the same animal, from which the author concludes that they are "mutually exclusive."

The gross pathological conditions caused by the spirillum are so much like those caused by the Bang bacillus that the character of the lesions can not be used as the basis for a prediction that one

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

² Vol. 28, No. 6, Dec. 1, 1918.

or the other organism is present. A peculiarity of the spirillum is that it seems to be limited to second and later pregnancies.

From fetuses the spirillum can be isolated under the same bacteriological conditions as the Bang bacillus; the distribution of the two organisms in aborted fetuses is practically the same, but the spirillum, unlike the bacillus, is not pathogenic for guinea pigs.

Microscopically the spirilla have been detected both in the fetus and the placenta, but not in every case from which pure cultures were obtained. The precise habitat in the chorion has not been determined. It is supposed, if it is granted that the seat of the disease is in the fetal membranes, particularly the chorion, that the spirilla make their way into the amniotic fluid and thence into the respiratory and digestive tracts of the fetus. The micro-organism is Gram negative; the importance of suitable staining to detect it is emphasized; in young cultures it is actively motile; in cultures more than a week old no motility can be observed. No reference to agglutination or complement-fixation tests is made in the article.

Whether the spirillum of Smith and the vibrio, which more commonly attacks ewes than cows, described by Stockman and McFadyen in 1913 are identical remains an unsettled question. Neither can we judge from Dr. Smith's work, as it was confined to herds which were in contact with each other, whether spirillum abortion disease among cattle in America is commoner than vibronic abortion disease among cattle in Great Britain. Of the latter Stockman informs us that only three outbreaks were found among many thousand outbreaks of abortion disease investigated.³

In this connection it may be interesting to call attention to the isolation of spirilla, in pure cultures, from aborted fetuses, in four cases, in the Pathological Division of the Federal Bureau of Animal Industry. The blood serum of the cows which aborted the fetuses in these cases agglutinated suspensions of Bang abortion bacilli, and Bang abortion bacilli were found in the uterus of one cow and in the milk of another.

Spirilla are not exceptionally rare organisms, and those isolated by the Pathological Division may be wholly different species from those isolated by Smith; hence the "mutually exclusive" character of the Smith spirillum and the Bang bacillus is in no sense refuted by the observations of the Pathological Division.

It is to be hoped that spirillum abortion disease among cattle will not prove a common or widespread evil, or, if it is found to be com-

³ Journal of the A. V. M. A., August, 1919.

mon, that it can be controlled by the same measures which may eventually prove effective against the disease caused by the Bang bacillus.

In an article by Dr. Ernest W. Smillie, of the Department of Animal Pathology of the Rockefeller Institute for Medical Research,⁴ under the title "An Improved Method for Isolating and Recovering the Bacillus of Cattle Abortion Through Guinea Pigs," it is pointed out that the number of bacteria present in the tissues of guinea pigs inoculated with abortion bacilli is probably greatest toward the fourth week, but that manifest lesions become more conspicuous as the number of bacteria tends to decline; hence, if guinea pigs are inoculated with abortion material to recover abortion germs, they should be killed between the third and fourth weeks, but if they are inoculated for diagnostic purposes they should preferably be permitted to live seven or eight weeks. The guinea-pig method is characterized as especially useful for the isolation of abortion bacilli from fetal membranes, which are usually received in an unclean condition, and the spleen of the guinea pig is the organ in which the bacilli are regularly present in the largest numbers.

A second article by Dr. Theobald Smith bears the title "A Characteristic Localization of Bacillus Abortus in the Bovine Fetal Membranes."⁵ In this it is recorded that the chorionic epithelium is a choice habitat of the Bang abortion bacillus. The invasion may be so great that the cytoplasm, in sections stained with eosin-methylene blue, has a blue appearance which, under high magnification, is resolved into fine, rod-like bodies. The bacilli do not lie on the cells, but within their bodies, which they may fill entirely. In addition to the chorionic epithelium, the epithelial cells at the margins of the cotyledons and those of the outermost villi of the latter are invaded. The changes in the cells are described and it is stated that similar cellular changes are not found in fetal membranes from normal gestations or cases of abortion associated with spirilla.

The tentative explanation given of the manner in which the bacilli, which have no true motility, enter the epithelium, is that they reach the utero-chorionic space by the way of the blood vessels in the uterine wall, adhere to the ectoplasm of the cells, and are rubbed into the cytoplasm by the pressure of the uterine wall on the chorion. Other types of epithelia, like those of the uterine mucosa and of the amnion, have not been found to be invaded.

⁴ Journal of Experimental Medicine, vol. 28, No. 5, Nov., 1918.

⁵ Journal of Experimental Medicine, vol. 29, No. 5, May, 1919.

This excellent study, unless I am greatly in error, tends to support the conclusion that the abortion bacillus of Bang can not maintain itself in the non-gestating uterus, and that abortion bacilli introduced into the uterus before or at the time of conception are not responsible for abortion disease. Apparently the bacilli to which the damage is chargeable must enter the uterus after tissues in which they can multiply have developed, and via the blood stream and not the vagina. This view is in complete harmony with the data we have regarding the rapid disappearance of abortion bacilli from the uterus after an abortion and the failure of those investigators who have made special studies of the bull as an agent for the infection of the cow at the time of copulation to find incriminating evidence against him.

Furthermore, the disease caused by the Bang abortion bacillus, whatever its sequelæ and complicating affections may be, evidently is a disease primarily of neither the dam nor the fetus, but rather of the outermost of the fetal membranes, which may account for the slowness with which immunity against it develops and the need for massive doses of living germs in artificial attempts to produce immunity.

In a bulletin of the Pennsylvania Department of Agriculture,⁶ on "Contagious Abortion of Cattle and the Uterine Douche Treatment," by Dr. W. H. Ridge, compiled by Dr. W. S. Gimper, I find two statements that I wish to call to your attention. In speaking about swabbing the os uterus and the cervical canal with full-strength Lugol's solution when indications of inflammation and granulation are present, we are informed:

"If some of the full-strength solution enters the uterus, it will cause no discomfort or harm. But care must be taken to prevent dropping into the vagina, as this will cause straining and general discomfort. The vaginal mucous membrane will tolerate a solution only one-fourth the strength of that which may be safely used in the uterus."

I am curious to know whether the last sentence in the quoted paragraph is true, and if so, what proof we have of its truth.

The second statement concerns the effect of the douche treatment for the relief of contagious abortion on milk production. Among 46 tested cows it was found that the milk flow was increased in 33, remained stationary in 6 and was reduced in 7.

With the present high cost of food and a demand for milk that

⁶ General Bulletin, No. 323, February, 1919,

exceeds the supply, any rational treatment that may increase the milk production of cows must be valued as economically very important.

The August number of the JOURNAL of the American Veterinary Medical Association contains an article on "Vibronic Abortion" by Sir S. Stockman. As a rule when a man of the caliber of Stockman addresses us it is to our advantage to take notice, and therefore I reasonably presume that it is not necessary to say anything to the members of this Association about his article.

In the same number of the JOURNAL a lecture, delivered to the veterinarians of the State of Indiana through the Agricultural Extension Service of Purdue University by Dr. W. E. Cotton of the Experiment Station of the Federal Bureau of Animal Industry, is published. Regarding the lecture I do not care to go into detail or to make any further comment than to say that it may be taken as a summary of the prevalent ideas and beliefs on abortion disease of cattle at the Experiment Station at the present time.

At the Station we believe that few things block progress more effectually than a tenacious adherence to alleged facts which newly discovered evidence has proved to be fallacies, or a dogmatic insistence on the validity of conclusions which better light has proved to be misinterpretations; hence a summary of what we believe today is by no means a summary of what we may believe in the future.

The next article to which I wish to call your attention bears the title, "Bacterium Abortus Infection of Bulls." It was published in the *Journal of Agricultural Research*,⁷ and its authors are Drs. J. M. Buck, G. T. Creech and H. H. Ladson of the Pathological Division of the Federal Bureau of Animal Industry.

Agglutination tests for abortion disease were made with blood obtained from 325 mature bulls which were received at an abattoir near Washington, D. C., and about the previous history of which nothing was known. The blood of 37, or 11.4 per cent, gave positive reactions. The vesiculæ seminales, vasa deferentia, testes and epididymides of the reacting bulls were secured and tested for the presence of abortion bacilli. From 4 cases among the 37, or 10.8 per cent, Bang abortion bacilli were isolated. In the four positively infected cases macroscopically determinable lesions were present in the vesiculæ seminales, and it was only the vesiculæ seminales that yielded abortion bacilli.

The article also reports on another reacting bull with an enlarged

⁷ Vol. 17, No. 5, August 15, 1919.

testicle, from which 400 to 500 c.c. of pus was aspirated and found to be infected with Bang abortion bacilli. Later the diseased testicle was removed and bacteriological tests again revealed abortion bacilli. One important fact about this bull is that, at the time pus was aspirated from his diseased testicle, 20 to 30 c.c. of turbid fluid was obtained through his urethral opening by massaging the seminal vesicles through the wall of the rectum. The fluid was examined for abortion bacilli, but its excessive contamination with other organisms left the studies in this respect inconclusive. That it was infected seems quite probable from a test reported by Cotton and myself in 1917, in which we found that the seminal fluid recovered from the vagina of a normal cow, immediately after she had been served by a reacting bull, was infected with Bang abortion bacilli.

This work of Buck, Creech and Ladson gives us considerable material for thought. We cannot conclude at once that approximately 1 out of every 10 bulls will react with abortion tests, or that approximately 1 out of every 10 reacting bulls harbors abortion bacilli in diseased seminal vesicles. But we may conclude that abortion reacting bulls are fairly common, and that disease of the seminal vesicles among reacting bulls is also fairly common. And, though we may know that we are practically without evidence to prove that bulls dangerously infect cows at the time of copulation, we may also conclude that reacting bulls are almost certainly dangerous, because of the abortion bacilli with which they may contaminate their environment by discharging infected material through their urethras. In other words, even if we conclusively prove that healthy cows, served by reacting bulls and bulls which have been exposed to abortion disease, do not become infected if they are otherwise protected against exposure, it will by no means prove that reacting, exposed or promiscuously used bulls are safe.

Another thing this work calls to mind is, as attempts to disinfect the seminal vesicles are hopeless, that some bulls are clearly unsafe for reasons that absolutely preclude the likelihood that they can be made safe by flushing or washing their sheaths or other accessible portions of their sexual organs with disinfectants.

In a general way the presence of abortion bacilli in the reproductive organs of bulls is indicated by strong, well-marked, rather than slight agglutination reactions.

In the *Schweizer Archiv für Tierheilkunde*, Zurich, 1918, W. Steck reports that investigations made at the Lieberfeld experiment station proved the occurrence of the abortion bacillus in the ap-

parently normal milk of seven cows of the station herd, again confirming, if further confirmation is needed, that the udders of cows are a common habitat of the bacillus.

Recently I received a copy of a paper entitled "Some Observations Concerning Abortion Disease," by Dr. B. T. Simms of Oregon, which was presented at a joint meeting of the Oregon and Washington State Veterinary Medical Associations. I do not know whether the paper has been published otherwise than I have here indicated, but it impresses me as meriting a wide circulation. It is based on practical observations extending over a period of more than four years, and is particularly instructive because of the light it throws on the spread of abortion disease from animal to animal.

In one herd 16 heifers were fed raw milk from the infected herd and then protected from exposure during pregnancy. All calved normally and remained negative to agglutination tests. In another herd the heifers were removed from the infected environment at the age of 6 months and kept on another farm until the termination of the first pregnancy. None aborted, and all remained negative to agglutination tests. In the two herds from which the heifers were derived abortions were of frequent occurrence; in one they averaged 29 per cent for 4 years.

In speaking of pen and pasture exposure Dr. Simms says:

"After heifers once become negative to the agglutination test they have remained uniformly negative until conception took place. All of them have been exposed to some degree * * *. In some instances, moreover, aborting cows have been penned with young heifers. Such heifers have uniformly had normal gestation periods, negative agglutinations, and have given birth to normal calves unless they were exposed during pregnancy."

Regarding bulls the following data are given: In a group of heifers served by regular herd bulls 21 normal births occurred and no abortions. The heifers were in an abortion-free environment during pregnancy. In 16 instances the services were by bulls which had sired aborted fetuses. In the general management of the herds the bulls were not permitted to serve cows showing disease of the genital organs until they were pronounced safe by the veterinarian in charge. No other precautions were taken to prevent the bulls from carrying and disseminating infection.

Among 11 heifers exposed in a barn during pregnancy to abortion-infected cows, 8 aborted and gave positive agglutination reactions.

The data go far to show that the easiest way to spread Bang abortion disease is by exposing pregnant cows to an abortion-infected environment, and that, possibly, if we can devise some means through which heifers and cows can be protected against exposure to infection during the period of gestation, we will have taken a long step toward the control of the evil which is due to the Bang bacillus.

This view is supported by a short paper presented by G. A. Dick, of Philadelphia, at the January meeting of the Pennsylvania State Veterinary Medical Association and published in the October number of the JOURNAL of the American Veterinary Medical Association.

In conclusion I wish to say that it is my opinion that the fight against infectious abortion disease would make better progress if a sharper distinction than now seems customary could be made between this disease and other affections of the female reproductive organs.

It makes no difference whether infectious abortion disease is due to the Bang bacillus, the Smith spirillum, the vibrio of Stockman and McFadyean, or some other as yet unidentified microorganism, the treatment of prior, simultaneous and subsequent evils, like metritis, pyometra, salpingitis, ovaritis, cystic ovaries, etc., accomplishes little more as an actual control measure than, for example, the treatment of scarlatinal nephritis accomplishes toward checking epidemics of scarlet fever.

Abortion disease, the kind caused by the Bang bacillus, and which the available evidence induces me to believe is the only kind among cattle of which we can say with certainty that it is common and widespread, may cause smaller losses in herds maintained under prime sanitary conditions and proper veterinary supervision than in herds under insanitary conditions; but all the sanitation in the world, once the disease has entered a herd, unless definite, specific measures based on its etiology are adopted, can neither check its course nor prevent its spread to other herds. And the sum of all the sanitary precautions that can be practiced will not safeguard a herd against this kind of abortion disease unless it excludes carriers and disseminators of abortion bacilli from it, the seemingly sound and healthy carriers as well as the sensibly diseased.

Treatment of the various diseases of the reproductive organs, apart from whether they are forerunners, complications or sequelæ of abortion disease or wholly independent affections, is eminently desirable and economically necessary, and offers an enormous field

for practice; but to speak of a miscellaneous assortment of pathological conditions as though they were all abortion-disease phenomena, and their treatment valuable measures for the control of the disease, must inevitably lead to a confusion of ideas that can not fail to engender uncertainty and timidity among professionally trained men and mistrust among owners of live stock.

Since the foregoing review was written, four additional articles have been published, all in the October number of the *Journal of Experimental Medicine*,⁸ which should be included.

The first is by Theobald Smith and Marian S. Taylor and bears the title "Some Morphological and Biological Characters of the Spirilla (*Vibrio fetus*, n. sp.) Associated with Disease of the Fetal Membranes in Cattle." It deals with 22 strains of spirilla isolated from fetuses and 2 from calves. Tests showed that only 1 of the 2 from calves was wholly identical with 21 of the 22 isolated from fetuses. One of the 22 from fetuses was an aberrant form. All the strains were derived from one large herd into which cattle from the outside are introduced from time to time.

The thermal death point of "*Vibrio fetus*" is shown to be 55° C. maintained 10 minutes, or 56° C. maintained 5 minutes. Dried on bits of linen thread at from 75° to 75° F., it is still alive after 2 but dead after 3 hours. Hence it seems to be a very delicate organism which can not long survive when it is removed from its proper environment.

The second article is by Theobald Smith and bears the title "The Etiological Relation of Spirilla (*Vibrio fetus*) to Bovine Abortion." In this article one case is recorded in which both the spirillum and the *Bacillus abortus* were found. The author states that "the dropping of immature calves and fetuses of various ages can no longer be referred to the *Bacillus abortus* without a bacteriological study of the fetus and placenta if obtainable, or else of the uterine discharges obtained with swabs and examined microscopically and by inoculation of guinea pigs." Outbreaks of abortion solely due to the *Bacillus abortus* are regarded probably to occur when the herd is first attacked and therefore highly susceptible. After a time the acquired immunity of the herd is supposed to modify conditions and *Bacillus abortus* becomes a relatively unimportant factor in all but first pregnancies.

Four pregnant cows were inoculated with suspensions of spirilla. Two afterwards produced calves and two were slaughtered before

⁸ Vol. 30, No. 4, pp. 299-357, October 1, 1919.

calving. In the two which calved lesions were found in the placenta which were referable to the injected organisms; the two other cases were negative. These tests, as the author points out, can not be regarded as final.

The third article, also by Theobald Smith, bears the title "The Bacteriology of Bovine Abortion with Special Reference to Acquired Immunity." The author, after presenting his own investigations and referring to the views expressed by others, makes the following statement: "If we control the data by the bacteriological results obtained, we find that relatively few cows are subject to disease of the fetal membranes due to the *Bacillus abortus* twice." "Abortions do occur in succession but they are due chiefly to causes other than *Bacillus abortus*."

The following paragraph, quoted verbatim from the article, is particularly interesting:

"Were it not for agents other than *Bacillus abortus*, such as *Vibrio fetus*, and to a far less degree to miscellaneous septic and pyogenic organisms, and to unknown nonbacterial agencies, second and later abortions by the same cow would be relatively rare. It therefore becomes necessary in the future to distinguish between the tendency of any given cow to abort repeatedly and the relation of *Bacillus abortus* to such repeated abortions. If abortions are due to a variety of infectious and noninfectious agencies, a better knowledge of abortion can only be reached by a patient, thorough study of series of individual cases, followed by the necessary experimental tests in order that these agencies may be assigned their proper place. A further analysis of this material will be found elsewhere (Smillie, E. W., Little, R. B., and Florence, L., J. Exp. Med., 1919, xxx, 341). It is there shown that the udders of a relatively high percentage of cows become infected with *Bacillus abortus* probably during the first abortion disease. Cows while carrying *Bacillus abortus* in their udder may give birth to normal calves, or to fetuses infected with spirilla, or to sterile fetuses. Probably the udder becomes a protecting reservoir of immune bodies towards *Bacillus abortus*."

Dr. Smith's studies include 109 cases of abortion, which, bacteriologically, are divided as follows:

62 cases, or 57 per cent, *Bacillus abortus*.

26 cases, or 23.8 per cent, spirilla.

2 cases, or 1.8 per cent, *Bacillus pyogenes*.

19 cases, or 17.4 per cent, either sterile or else the digestive and

respiratory tracts had been invaded during or after birth with miscellaneous bacteria. *Bacillus abortus* was absent according to cultures and animal tests.

The fourth article, by Ernest W. Smillie, Ralph B. Little and Laura Florence, is entitled "An Interpretation of the Agglutination Reaction to *Bacillus abortus* in 75 Cases of Bovine Abortion Bacteriologically Controlled."

The authors point out that "the fact that Smith found in 109 cases of abortion or premature expulsion of a living calf 46 not associated with *Bacillus abortus* shows that our information in regard to the significance of the agglutination test has been built on somewhat insecure foundations."

The technique used in making the agglutination tests is defined in detail, and the results obtained in a number of instances are given individual attention.

Several tables are presented in the article, among which three are especially interesting. They are as follows:

Table III contains 21 cases of abortion associated with spirilla, among which 2 reacted with an agglutination titer of 1 to 80, 5 with a titer of 1 to 160, 2 with a titer of 1 to 640, and 4 with a titer of 1 to 1,280.

Table IV contains 11 cases of abortion with sterile fetuses or miscellaneous infection, among which 5 reacted respectively with the following dilutions: 1 to 160, 1 to 320, 1 to 640, 1 to 1,280, and 1 to 2,560.

Table V contains 45 cases from which *Bacillus abortus* was isolated, among which 4 failed to react with dilutions as low as 1 to 40.

The authors of the article conclude the summary they give with the following paragraph:

"In any herd a uniformly low titer (1:40 or less) in all animals may be regarded as indicating the entire absence of *Bacillus abortus*. A high titer in any one cow serves to indicate quite definitely the presence of infection in the herd. To determine more accurately the character of the infection in any individual cow there is needed in addition to the quantitative agglutination test a bacteriological study of the milk and of any prematurely discharged calf or fetus."

It must be borne in mind that all the investigations recorded in the four articles were made with one large herd of cattle; hence, if it is eventually proved that *Vibrio fetus* is a true cause of abortion disease, no data are supplied regarding the general importance of this organism. Taking the four articles, together with the original

publication by Theobald Smith on spirillum as a cause of abortion disease, we are obliged to conclude regarding the Bang bacillus and the Smith spirillum that, in the place of being mutually exclusive, the former seems to be an agent which paves the way for the latter to act, and it seems to be quite clear that, whatever else the data in the five articles may signify, they do not in any measure tend to detract from the great economic importance of the Bang abortion bacillus.

Our Secretary, Dr. N. S. Mayo, recently visited Toronto, Canada, on a business trip for his company. While there he visited Dr. McGilvray, Dean of the Ontario Veterinary College, who informed him that a bill had been introduced into the Legislative Assembly of Ontario which has for one of its purposes the closing up of the London, Ontario, correspondence college of veterinary quackery. The proposed paragraph follows:

"No person or persons, association, company or organization shall hereafter conduct in Ontario courses in veterinary science for which fees are charged and certificates or diplomas granted without a certificate of authorization from the Minister, and a certificate shall only be issued after investigation by the board has shown that the requirements of admission and courses of study and instruction are at least equal in standard to that of the Ontario Veterinary College."

Dr. Mayo also called on Dr. E. A. Grange, who is confined to his bed as a result of a cerebral hemorrhage that occurred several months ago.

Information has just been received to the effect that at the last meeting of the South Carolina General Assembly a law was passed regulating the practice of veterinary medicine in the State. Dr. W. A. Barnette, Greenwood, S. C., is secretary and treasurer of the Board of Veterinary Examiners created by this law. There are now only three States—Arizona, Florida and New Mexico—which do not have a law regulating the practice of veterinary medicine. The veterinarians of South Carolina are to be congratulated on their success in securing the passage of this law.

Dr. C. H. Hays, who has had charge of coöperative hog-cholera work in Indiana, has been placed in charge of the various lines of B. A. I. activities in Nebraska, succeeding the late Dr. S. E. Cosford.

THE EFFECT OF THE INTRADERMIC MALLEIN TEST ON SUBSEQUENT COMPLEMENT-FIXATION TESTS FOR GLANDERS

By CAPTAIN R. A. KELSER *and* 1ST LIEUT. JOHN G. HARDENBERG, JR.,
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IN the fall of 1918 the intradermic palpebral mallein test was adopted as an official test for glanders in the United States Army. Previous to this time the ophthalmic mallein test was the official field test of the Army and was the test used throughout the country practically to the exclusion of other methods of diagnosis available to the veterinary practitioner. The intradermic test, while essentially new in the United States, has, however, been rather extensively employed abroad. It had been in general use by our Allies during the war and was used exclusively in our own service overseas before its adoption by the Army in this country. Since its adoption as an official test by the Army the United States Department of Agriculture has recognized it as an official test in connection with the interstate shipment, exportation and importation of horses, mules and asses. The results obtained with this test have been very satisfactory and it bids fair to become an important factor in the control of glanders in the United States.

In checking up doubtful or suspicious reactors to the allergic tests for glanders, the serological tests have always proven of great value. The United States Bureau of Animal Industry conducts annually thousands of complement-fixation, agglutination and conglutination tests for glanders. Various State institutions are equipped for conducting the tests with a view of controlling indefinite results with field tests. The United States Army, shortly after entrance into the war, established veterinary laboratories in the different military zones, and the application of the serological tests for glanders was a leading factor in the activities of such laboratories.

During the period when the subcutaneous mallein test was generally employed in this country for the diagnosis of glanders it was recognized by those conducting the serological tests that the injection of the prescribed dose of subcutaneous mallein gave rise to specific antibodies in the blood of normal animals, and that when specimens of blood serum from such animals were subjected to the complement-fixation or agglutination tests for glanders what appeared to be a suspicious or even positive reaction would very

frequently be obtained. Thus a blood test of animals recently injected with subcutaneous mallein could only be considered reliable when negative reactions were obtained. If a blood sample was not obtained within a few hours (usually 48) subsequent to the injection of mallein, it was necessary to wait approximately 30 days, or even longer in some instances, before a satisfactory serological test could be obtained. Thus when the ophthalmic mallein test came into prominence one big advantage immediately recognized was the fact that instillation of the mallein into the conjunctival sac did not in any way influence subsequent serological tests. Therefore, when the intradermic palpebral test for glanders was being considered by the Army its possible effect on the serological tests employed to augment the field test at once became an important question.

MAJOR GILLILAND'S EXPERIMENT

With this in view a test was undertaken in August, 1918, at the Camp Dix Remount Depot by Major S. H. Gilliland, then Commanding Officer of this Laboratory, to determine what effect, if any, the injection of the prescribed dose of mallein intradermically into the palpebrum of horses would have upon the blood serum of such horses as regards its reaction to the serological tests, particularly the complement-fixation reaction.

Ten healthy horses were selected and specimens of blood taken from each and subjected to the complement-fixation test for glanders to demonstrate their freedom from complement-fixing bodies due to glanders infection or present as nonspecific elements. These 10 horses were then given the prescribed dose (0.1 c. c.) of special mallein intradermically in the lower eyelid. They were observed for 48 hours for possible reactions. All were negative. Blood specimens were then taken at intervals of 3, 6, 12 and 16 days, respectively, subsequent to the injection of the mallein, and were subjected to the complement-fixation test for glanders, employing the same technic as is used in applying the test for diagnostic purposes.

It is regretted that through error the horses were released for issue after the bleeding on the sixteenth day, and also that bleedings were not taken before the third day subsequent to injection and between the sixth and twelfth days. The results of this test, while incomplete, demonstrated, however, that the injection of the prescribed dose of intradermic mallein may give rise to complement-fixing bodies in the

blood serum of animals thus injected, and thereby affect the complement-fixation test for glanders.

The findings in this test, even though incomplete, are described because it is desired to compare the degree of reaction obtained by Major Gilliland with the serum from these 10 animals, which had never received injections of intradermic mallein previous to his experiment, with the reactions obtained by the writers with horses that had received a number of injections of mallein in the course of routine testing prior to our work with them.

Table 1 shows the results obtained by Major Gilliland.

TABLE 1.—TESTS BY MAJOR GILLILAND.

Horse	Results of Pre-injection Bleeding		Mallein Injection		Results of tests of blood serum after injection of Mallein							
					3 days		6 days		12 days		16 days	
	0.2cc.	0.1cc.	Date	Amt.	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1
A	—	—	8-29-18	0.1cc.	2+	1+	2+	—	4+	4+	3+	2+
B	—	—	"	"	—	—	—	—	—	—	—	—
C	—	—	"	"	R	—	1+	—	3+	2+	—	—
D	—	—	"	"	—	—	1+	—	—	—	—	—
E	—	—	"	"	—	—	—	—	—	—	—	—
F	—	—	"	"	—	—	R	R	—	—	—	—
G	—	—	"	"	—	—	2+	3+	—	—	—	—
H	—	—	"	"	—	—	1+	—	—	—	—	—
J	—	—	"	"	—	—	—	—	—	—	—	—
K	—	—	"	"	R	1+	R	—	—	—	—	—

Explanatory notes

— denotes no fixation of complement.

R, less than 25 per cent. fixation of complement.

1+, approximately 25 per cent. fixation of complement.

2+, approximately 50 per cent. fixation of complement.

3+, approximately 75 per cent. fixation of complement.

4+, 100 per cent. fixation of complement.

Control tubes not charted, as results were negative in all cases.

From Table 1 it will be noted that the serum from 1 of the 10 horses (Horse A) gave a 2 plus reaction in 0.20 c.c. amounts of serum and a 1 plus reaction with 0.10 c.c.; that a second of the 10 animals (Horse K) gave an "R" reaction in 0.20 c.c. amounts and a 1 plus with 0.10 c.c.; and that a third animal (Horse C) gave an "R" reaction in 0.20 c.c. amounts; all on the third day subsequent to the mallein injection. It will also be seen that the serum from Horse A gave a 3 plus reading in 0.20 c.c. amounts and a 2 plus reaction with 0.10 c.c. of serum on the sixteenth day, the last day the animal was bled.

Thus, while this test demonstrates the fact that complement-fixing

bodies may result from the injection of the usual dose of intradermic mallein, it does not demonstrate the earliest period following malleinization that the complement-fixing bodies are demonstrable in the blood serum, nor for what period of time they persist.

CAMP DIX TEST

With a view to obtaining additional data on the subject the following test was undertaken by the writers at the Remount Depot, Camp Dix, N. J., in May, 1919:

Twenty healthy horses were selected. The animals were bled for preliminary test to demonstrate the absence of complement-fixing bodies, and were given injections of Army intradermic mallein, prepared by this Laboratory, into the lower palpebrum of the left eye. The first 10 animals received the prescribed dose of 0.10 c.c. The remaining 10 horses received twice the dose (0.20 c.c.), in consideration of the fact that in the average routine mallein test a number of the animals undoubtedly receive a quantity somewhat in excess of the prescribed dose. These animals were then kept in a separate corral, after being numbered for identification, and specimens of blood were taken daily, commencing 24 hours subsequent to the mallein injection, and continuing beyond the point where the animal became negative.

The blood samples were drawn into sterile test tubes with great care to prevent contamination. After coagulation they were carefully packed and forwarded by special delivery mail to the laboratory, usually arriving late in the evening within six hours subsequent to mailing. On arrival they were immediately placed on ice, and the following morning the clot was "loosened" with a sterile wire where it was found adhering to the sides of the test tube and all the specimens were centrifugalized. The clear serum was then drawn off of each sample, about 1 c.c. from each tube being placed in sterile cotton-stoppered test tubes for the first test and the remainder placed in sterile rubber-stoppered vials, preserved with $\frac{1}{2}$ per cent phenol, properly labeled, and stored in the refrigerator for further tests. The specimens thus prepared represented clear, amber-colored serum, free from contamination, and were in excellent condition for accurate test.

The bleedings were continued for 21 days, except in the cases of horses Nos. 10 and 19, which were still giving reactions. Immediately following the twenty-first bleeding a second injection of mallein was administered into the lower palpebrum of the right eye

of all animals except Nos. 10 and 19, these latter two receiving their second injection on June 12 immediately following the thirty-first bleeding. The second injection was given with the idea of comparing the resulting degree and duration of reactions with those obtained as a result of the first injection.

It will be noted in Table 2 that the blood specimen from horse No. 10, taken prior to the first injection of mallein, contained complement-fixing bodies, present undoubtedly as a result of an intradermic mallein test to which this animal had been subjected a little over a month previous. The complement-fixing bodies seemingly persisted in this horse for a longer period of time than with the average animal. Inasmuch as the injection of mallein had been made immediately following the taking of the preliminary blood specimen and before the results of the complement-fixation test could be had, the subsequent tests were continued with horse No. 10 as a matter of interest.

In applying the test the following procedure was employed: The preinjection specimens were tested the day following their procurement, and representative samples were prepared and preserved as previously described, for future use. The post-injection specimens were tested at 5 or 6 day intervals (6 day intervals when the fifth day fell on Sunday). Thus the first test of specimens taken subsequent to the mallein injection included those taken on the first, second, third, fourth and fifth days respectively; the second test, the next 5 or 6 days' samples, etc. This procedure of testing 5 or 6 days' specimens was carried out with a view of more accurately demonstrating the gradual day-to-day increase and decrease of complement-fixing bodies, as otherwise a slight variance in the hemolytic system employed in individual tests might obscure comparison. Further, after blood specimens from those of the 20 horses that had shown reactions following the first injection of mallein had become negative, all individual specimens from such reactors, taken during the entire period, were tested at one time, the various samples thus being all tested under identical conditions, making an accurate comparison possible. This same procedure was followed with the specimens taken subsequent to the second injection of mallein. A final test was then made, testing simultaneously all specimens taken subsequent to both the first and second injections of mallein that had shown the presence of complement-fixing bodies in the former tests. Thus each specimen that gave any reaction throughout the experiment was tested at least three times. Several retests were made of some lots of

samples, so a number of the specimens were subjected to as many as four or five tests.

The technic of the complement-fixation test employed was that recognized as a standard method for applying the test in the Army laboratories, with the exception that in titrating the complement in the hemolytic system a much wider range of graduation was employed than is usually used in the ordinary titration. Further, the titration was read "close" and $1\frac{1}{4}$ units of complement employed rather than $1\frac{1}{2}$ units, the amount used in the ordinary diagnostic test. Our purpose was to employ no more complement than was necessary to give complete hemolysis in tubes containing a known negative serum and glanders antigen. The complement titrations were controlled by testing simultaneously with each lot of specimens from the 20 horses a number of negative sera from animals that had never been subjected to the intradermic mallein test.

Table 2 shows the results obtained with the 20 animals used in this test.

From Table 2 it will be noted that following the first injection of mallein the serum of 1 of the 20 animals (horse No. 9) was shown to possess complement-fixing bodies in 48 hours. One animal (horse No. 20) developed complement-fixing bodies 72 hours subsequent to the injection. On the fourth day the sera from 2 horses (Nos. 16 and 19) were shown to possess complement-fixing bodies. Horse No. 10 also showed a rise in complement-fixing bodies on this date. Four animals (horses Nos. 6, 14, 15 and 18) had developed complement-fixing bodies by the fifth day. On the sixth day horses Nos. 3 and 12, the last 2 of those of the 20 animals that developed demonstrable complement-fixing bodies as a result of the mallein injection, gave a reaction.

Thus as a result of the first injection, if we count horse No. 10 which showed an increase in complement-fixing bodies, 11 out of 20 animals developed antibodies, making their appearance in the blood serum of 1 horse within 48 hours, in 1 horse within 72 hours, in 3 horses within 96 hours, in 4 horses within 120 hours, and 2 horses within 144 hours.

Following the second injection of mallein 10 of the same 11 horses which reacted in the first instance again responded to the injection, the remaining 10 animals being negative.

From Table 2 it will also be noted that there was a slight tendency toward an earlier reaction following the second injection of mallein. This was undoubtedly due to complement-fixing bodies possessed in

undetectable numbers by the animals that had responded to the first injection of mallein and subsequently become entirely negative so far as the complement-fixation test was capable of demonstrating. Thus it is believed that following the second injection of mallein those relatively few complement-fixing bodies already present, in addition to those being gradually produced as a result of the second injection, resulted in the presence of a demonstrable number of the antibodies a trifle sooner than would otherwise have been the case.

Following the first injection of mallein it will be noted that complement-fixing bodies persisted in 3 of the 11 horses that developed antibodies in detectable numbers for 4 days. They persisted in 1 horse for 5 days, in 1 horse for 10 days, in 2 horses for 11 days, in 1 horse for 12 days, in 1 animal for 14 days, in 1 animal for 28 days, and 1 animal for 30 days.

It will be noted that subsequent to the second injection the period of persistence was, in several instances, less than shown as a result of the first injection, particularly as regards horses Nos. 10 and 19. There was also a tendency toward reactions of less degree following the second mallein injection.

It will be seen that the intradermic injection of the prescribed dose (0.10 c.c.) of mallein into 9 horses (not considering horse No. 10, which already possessed complement-fixing bodies in demonstrable numbers) gave rise to the development of antibodies in 3 of that number (33 1-3 per cent). Injections of twice the dose (0.20 c.c.) into 10 animals gave rise to complement-fixing bodies in 7 of that number (70 per cent). It will be further noted that a total of 7 of the 11 animals that developed antibodies after the first injection manifested the same on the fourth and fifth days (counting horse No. 10, which showed an increase on the fourth day). A total of 8 out of the 10 animals that reacted to the complement-fixation test after the second injection manifested the complement-fixing bodies on the fourth and fifth days. Two weeks subsequent to the date of the first mallein injection there were 7 of the 11 animals that developed complement-fixing bodies, reacting. Two weeks subsequent to the second inoculation there were 4 out of the 10 that responded to the second injection, reacting. On the eighteenth day following the first mallein injection specimens from all horses with the exception of Nos. 10 and 19 were negative. On the seventeenth day subsequent to the second inoculation all of the animals had become negative.

Thus in horses that have had numerous injections of mallein it

appears that, while complement-fixing bodies may be demonstrated as early as 48 hours subsequent to the injection of not more than twice the prescribed dose of intradermic mallein (0.20 c.c.), and may persist for 30 days, the average cases develop complement-fixing bodies in demonstrable numbers by the fourth or fifth day and that they disappear within approximately two weeks.

The degree of reaction obtained with the 20 horses in this experiment was generally low. Only in one instance was a 4 plus reaction (100 per cent fixation of complement) obtained, and this was with 0.20 c.c. of serum. The highest degree of reaction obtained with 0.10 c.c. amounts of serum was a 2 plus reaction (approximately 50 per cent fixation of complement), and this occurred in only one instance. A typically positive blood serum from a case of glanders usually fixes completely the $1\frac{1}{2}$ units of complement employed in the diagnostic test in 0.10 c.c. amounts and lower. Had the complement employed in our tests not been titred down to the lowest possible amount with a view to demonstrating the greatest degree of reaction, the readings recorded in Table 2 would have been of still less degree.

Thus comparing the results of this experiment with those obtained in Maj. Gilliland's test, in which the complement-fixation technic employed was the same as is used in the usual diagnostic test, there being no particular effort to titre the complement down to the very smallest amount possible, there is a strong suggestion of a greater degree of reaction with horses that have never been previously subjected to injections of mallein than with animals having been given a number of intradermic mallein tests previously. (The 10 horses used by Maj. Gilliland had never had intradermic mallein; the 20 employed in our test had.)

FRONT ROYAL TEST

To clear up this point a further test was conducted with 12 colts at the Remount Depot, Front Royal, Va. These animals were reported as never having been subjected to an injection of mallein of any kind.

A visit was made to the Remount Depot, the animals were bled for a preliminary test, and the injection of mallein was given. The first 6 animals were given intradermic injections of the usual dose (0.10 c.c.) of Army intradermic mallein, and the remaining 6 twice the dose (0.20 c.c.).

Arrangements were made for the collection of blood specimens every 24 hours subsequent to the mallein injection. The samples

were bled aseptically into sterile test tubes, allowed to coagulate, the clots "loosened" with a sterile wire from the sides of the tubes where necessary, and after standing in the refrigerator over night the clear serum was poured off into sterile vials and immediately shipped to the laboratory. The serum specimens were prepared at the Remount Depot rather than sending whole blood specimens to the laboratory as was done with the samples from Camp Dix, because of the greater length of time required to get the material from Front Royal to the laboratory. All of the specimens arrived in excellent condition and were satisfactory in every way for accurate test.

The complement-fixation test was applied to the preinjection specimens, with the result that the serum from colt No. 7 gave a 4 plus reaction with 0.20 c.c. of serum and a 1 plus reaction with 0.10 c.c. As these animals were supposed never to have received a mallein injection, colt No. 7 was reported as being a glanders suspect. Information requested regarding the results from the mallein injection was to the effect that no suggestion of any reaction was manifested. It was recommended that the animal be quarantined and the daily blood specimens submitted from it along with the samples from the other 11 animals.

As will be noted from Table 3, the serum specimen from colt No. 7 showed a gradual increase in complement-fixing bodies up to and including the ninth day, and from then on they diminished and became entirely negative. The reaction therefore was not due to glanders infection, but was in all probability due to an injection of mallein of which the Remount Depot had no record, it having possibly been administered before the animal was received by the Remount Depot.

As in the chart of the Camp Dix experiment, the reactions obtained with the specimens from colt No. 7 are shown in Table 3 as a matter of interest and because a definite increase in complement-fixing bodies following the mallein injection is shown.

The technic in the complement-fixation test employed was identical with that mentioned for the Camp Dix experiment. Five or six days' specimens were tested at one time as before. After all reactions had ceased a single test was carried out, testing simultaneously all specimens that had reacted during the experiment. Several of the individual tests were repeated so that every specimen that reacted was subjected to two separate tests, and quite a number were tested three times.

Table 3 demonstrates the results of this test.

From Table 3 will be noted that the injection of the prescribed dose (0.10 c.c.) of intradermic mallein into 6 horses gave rise to the development of complement-fixing bodies in 5 of that number (83 1-3 per cent). The injection of twice the usual dose (0.20 c.c.) in 5 animals (excluding colt No. 7, which already possessed complement-fixing bodies) resulted in 4 of this number (80 per cent) giving subsequent reactions to the complement-fixation test. It will be noted, however, that colt No. 7 showed a distinct increase in complement-fixing bodies, which was without doubt due to the mallein we injected. Thus in this test the percentage of animals which developed complement-fixing bodies in demonstrable numbers was practically the same with those that received the 0.10 c.c. dose of mallein as with those that were given twice the dose.

In this test tendency toward the greater degree of reaction was not with the animals receiving the larger dosage, as was noted in the previous test, but was with those receiving the 0.10 c.c. dose. This may possibly have been due to variance in individual sensitiveness to mallein, the majority of the animals being most sensitive happening in this particular test to receive the smaller dose.

In one instance (colt No. 2) a reaction was obtained to the complement-fixation test 24 hours subsequent to the mallein injection. As this seemed rather early for a reaction to appear, the test of this particular specimen together with the preinjection sample was repeated several times to preclude the possibility of error. The results were identical in all instances, and this, together with the rapid increase in complement-fixing bodies noted in the subsequent specimens from this animal, leaves no room for doubt regarding the specificity of the early reaction.

Generally there was a tendency toward a somewhat later development of the complement-fixing bodies in the remainder of these "green" horses than was noted with the animals that had been given frequent injections of mallein.

It will be also be noted that in several instances the reaction persisted for a considerable period; in the case of colt No. 1 for 32 days subsequent to the mallein injection, and with colt No. 2 for 30 days subsequent to the date of malleinization.

The outstanding feature of this experiment, however, is the degree of reactions obtained as compared with the test conducted with the 20 animals at Camp Dix which had received a number of mallein injections previous to our work with them. In several instances typically positive reactions were obtained to our complement-fixation

test, reactions which would have been readily interpreted as indicative of glanders infection had the specimens been submitted for laboratory test without information regarding the mallein injection.

TEST OF SPECIMENS FROM ANIMALS THAT HAD RECEIVED NUMEROUS INJECTIONS OF INTRADERMIC MALLEIN

At the instance of the Surgeon General's Office, Veterinary Division, a test was made of a considerable number of blood specimens from animals which had received numerous injections of mallein, the last injection not having been given within three weeks of the date the specimen was taken for our test.

A total of 1,027 specimens, obtained from the remount depots at Camp Dix, N. J., Camp Meade, Md., Camp Sherman, Ohio, Camp Grant, Ill., Camp Dodge, Iowa, Camp Taylor, Ky., Camp Funston, Kans., Camp Pike, Ark., and the Animal Embarkation Depot, Newport News, Va., were subjected to the complement-fixation test for glanders.

Due to the fact that mule serum normally possesses hemolysis-inhibiting elements, it was planned to employ only horses in this test, but inasmuch as one of the remount depots, through error, forwarded specimens from 75 mules, these were tested.

Out of the 1,027 specimens submitted, 1,015 were entirely negative to the test. One sample gave a 4 plus reaction with 0.20 c.c. of serum and a 3 plus with 0.10 c.c. Another specimen gave a 4 plus reading with 0.20 c.c. of serum and a 2 plus with 0.10 c.c. Four of the remaining 10 specimens that gave reactions gave 3 plus readings with 0.20 c.c. of serum and from "R" to 2 plus reactions in 0.10 c.c. amounts. The remaining 6 specimens, which included 1 mule specimen, gave reactions varying from a 2 plus to an "R" with 0.20 c.c. of serum and a 1 plus to negative with 0.10 c.c. of serum.

Of the above 12 animals that gave reactions 10 were out of a lot of 116 specimens from horses returned from overseas and which were held in quarantine at the Animal Embarkation Depot, Newport News, Va. Blood specimens were submitted to the laboratory at regular intervals for the application of the tests for glanders, trypanosomiasis and piroplasmiasis. The previous glanders test had been entirely negative with all of the 116 samples. The Port Veterinarian was notified that 2 of the specimens (the 2 that gave 4 plus readings) were positive, the remaining 8 of the 10 samples that gave reactions being reported suspicious. He was informed, however, that the effect of mallein on subsequent complement-fixa-

tion tests should be considered. In two weeks 9 of these 10 animals gave entirely negative reactions to the complement-fixation test, and 9 days later a specimen from the tenth animal was entirely negative.

From the data at hand we are unable to offer an explanation for the high percentage of reactions in this particular lot of 116 animals as compared with the remainder of the 1,027 animals tested.

CONCLUSIONS

1. The injection of the prescribed dose (0.10 c.c.) of intradermic mallein gives rise to the production of complement-fixing bodies in demonstrable numbers in the blood serum of a percentage of the animals thus injected.

2. The injection of the prescribed dose (0.10 c.c.) of intradermic mallein in horses that have never been previously subjected to injections of mallein produces complement-fixing bodies in the blood serum of a much greater percentage of such animals than in those that have had numerous previous injections. In our test of the previously injected animals 33 $\frac{1}{3}$ per cent developed complement-fixing bodies following the injection of 0.10 c.c. of mallein, whereas of the "green" horses 83 $\frac{1}{3}$ per cent gave reactions to the complement-fixation test as a result of such injection.

3. There was a tendency toward a greater percentage of reactions among the previously injected horses where twice the dose (0.20 c.c.) of mallein was administered. This did not hold true as regards the horses that had never been previously injected.

4. A much degree of reaction to the complement-fixation test is obtained with blood specimens from horses that have just received their initial injection of intradermic mallein than with horses that have had a number of injections previously. The reactions obtained with such "green" horses following their first intradermic mallein test are such as to affect seriously the reliability of the complement-fixation test for glanders when applied soon after the mallein test.

5. Complement-fixing bodies may be demonstrated as early as 24 hours subsequent to the mallein injection, and may persist for 32 days subsequent to its injection. The average animal, however, develops them after 4 to 7 days subsequent to malleinization, and they persist for approximately 2 weeks after their appearance.

6. Due to the fact that the greater percentage of animals at present in the Army have been subjected to numerous intradermic mallein tests, it is believed that, generally, comparatively little difficulty will be experienced with serological tests subsequent to the

mallein testing of these animals, particularly if the blood specimen is procured immediately after the 48-hour reading of the mallein test. Newly purchased animals, however, will undoubtedly give trouble in this respect.

7. Where it is desired to supplement an intradermic mallein test with the complement-fixation test for glanders, the blood specimen should be taken immediately following the 48-hour reading of the mallein test. After this time a period of approximately 30 days from the date of the mallein injection should be allowed to elapse before taking the blood sample, as no reaction other than negative obtained with a specimen procured sooner could be considered reliable.

ACKNOWLEDGMENT

We wish to express our appreciation to Capt. J. W. Crouse, of the Camp Dix Remount Depot, and to Lieuts. F. M. Humphrey and L. E. Miller, of the Front Royal Remount Depot, for their coöperation in the collection of the excellent blood specimens upon which the success of our work was largely dependent.

Among the notables who spent the Easter season at the Nation's Capital were President Milton Campbell and Director John Reichel of the H. K. Mulford Company; Dr. E. M. Houghton, Director of the Laboratories, Parke, Davis & Co.; Dr. I. B. Paxton, Sales Manager of the Purity Serum Company; Dr. Roy V. Rafnel, Consulting Veterinarian for the Glidden Chemical Company; Dr. John Hopper, Ridgewood, N. J., and Dr. J. William Fink, Newburg, N. Y. The latter made a large number of purchases of dairy cows in Virginia and expressed much surprise at the number of accredited herds in that State, as well as gratification to find so little tuberculosis in other herds from which he purchased cows after applying the tuberculin test.

Dr. E. I. Smith, Inspector-in-Charge of Tick Eradication in Louisiana, has recently published the second edition of his "Standard Dipping Vat Record Book." This is a convenient method of recording accurately the conditions relative to dipping in any given territory. The book is ruled to record eight consecutive dippings with the name of the cattle owner, the date of dipping, the vat test, the number of dipped cattle found either ticky or free from ticks and the number of horses and mules dipped.

SOME OBSERVATIONS ON VETERINARY AND LIVESTOCK CONDITIONS IN THE SOUTH¹

By W. M. BURSON, *Athens, Ga.*

A VERY large proportion of the South is naturally adapted to the development and maintenance of the live-stock industries. The special features possessed by the South in this connection are a mild climate, which enables the stockman and farmer to provide sufficient shelter for his animals without the great investments in barns necessary for the protection of animals in colder portions of the country; a long grazing season during which animals may be maintained on pasturage with low expense of maintenance and correspondingly larger profits to the owner; a much greater variety of forage and pasturage crops that may be economically produced throughout the year. East of the Mississippi River drouths of long duration are practically unknown in the Southern States. The natural water supply of this section is second to no other section of the United States.

GREAT DEVELOPMENT DURING RECENT YEARS

Statistics make dry reading matter, hence I shall not quote them. The coming United States Census will show a greater development of the cattle and swine industries in proportion to past development than will be shown by any other section of the country. There have been notable increases in dairying in many sections of practically all Southern States during the last decade. A considerable number of cheese factories have been established, especially in the mountainous sections, and are now engaged in turning out a high-grade product in considerable quantity.

The production and feeding of beef cattle has increased in large measure. During the last ten years, following tick eradication, in many sections, fine herds of purebred beef cattle have been established, and this has had great beneficial effect upon southern agriculture. The invasion of the cotton-producing section of the South by the cotton-boll weevil has shown the southern farmer that he must diversify his farming, and a great deal of this diversification has taken the form of increased production of beef cattle.

The greatest live-stock development has, however, taken place in the swine industry. Many influences have been at work along this line. It may be interesting to note that the grand champion hog at

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

the 1918 International Live-Stock Exposition was raised and developed in Georgia. When the various States were called upon during the war to increase hog production the Southern States responded by increasing in larger percentage than other sections.

I am sorry to have to relate a considerable reduction of interest in the sheep industry. There are apparently several reasons for this. These reasons are: A stray dog nuisance in all parts of the South, upon which it is apparently impossible to get legislation for relief at present. A lack of education along the lines necessary for the development or maintenance of the sheep industries. Lack of fences on farms, and failure to provide rotation of pastures for sheep as is necessary in the control of parasites and diseases of sheep. Lack of proper drainage of pastures. The mountainous and rolling portions of the South are well adapted to sheep production, but, strange as it may seem, the greatest proportion of the sheep of the South are to be found in the Coastal Plains sections.

CONSTRUCTIVE WORK CARRIED ON

During the last several years a great deal of work designed to foster and increase the South's live-stock industries has been carried on by many organizations and interests. These may be enumerated as follows:

United States Bureau of Animal Industry.—Tick eradication; hog-cholera control work; tuberculosis control; influenza control; dairy and live-stock improvement work; pig clubs and calf clubs; marketing.

State Veterinarians.—Tick eradication; control work on hog cholera, tuberculosis, glanders, influenza, blackleg, anthrax, hemorrhagic septicemia and other infectious and parasitic diseases.

Railroads.—Introduction of purebred bulls and other breeding and dairy cattle; organization of live-stock clubs; cooperating with other interests in the conducting of agricultural and live-stock trains for educational purposes; cooperation in live-stock sales; giving scholarships to short courses at agricultural colleges.

Fair Associations.—During the last decade many of these associations have been organized and fairs conducted along the lines usual in other sections. This has been of great value along live-stock lines.

Agricultural Colleges.—These great institutions have been untiring in their efforts to develop and improve the live-stock industries along all lines. They have given active support to all lines of

disease control work carried on by Federal and State agencies and to live-stock improvement work carried on by any agencies whatsoever. The extension work of the United States Department of Agriculture is carried on in cooperation with and under the supervision of the colleges. Various departments of the colleges have been especially active along the lines of animal diseases and parasites, breed improvement, better feeding methods, pasture improvement, the arranging and conducting of live-stock sales, the organizing of live-stock associations and live-stock clubs, the pig clubs being especially beneficial in improving the quality and increasing the numbers of swine. The introduction of breeding animals, purebred and high grade, the aid given the farmers in pasture improvement work, silo construction, and the testing out of improved methods of feeding cattle and hogs have shown to many farmers that the live-stock industries are more profitable than they believed them to be, and through these means many farmers have become interested and have engaged in the production of live stock upon a permanent and profitable basis.

County Agents.—The greatest amount of the live-stock improvement work carried on has been in cooperation with the county agents. These men are in touch with local conditions and are required to assist all of the above-mentioned forces in work carried on in their counties. They constitute in their respective states an active, organized force earnestly endeavoring to improve agricultural conditions along all lines.

Packing Plants.—During the last few years numerous packing houses have been constructed and operated successfully. The value of live stock marketed through these establishments runs into the millions of dollars annually during the last four or five years, whereas ten years ago such establishments as are now conducted with profit would have existed precariously if at all. These plants are a great educational force. Some have interested themselves in a substantial manner in live-stock improvement work. They provide a ready market for cattle and hogs throughout the year and educate the farmer up to an understanding of market classes and grades and teach him that high-grade and purebred animals are more profitable than the scrubs that he has been accustomed to raising, and give him a broader insight into the magnitude of the live-stock industries of the nation.

VETERINARY PRACTITIONERS

The practitioners of the South are prosperous and many more are needed. Their number has more than doubled in the last eight years, and there are yet hundreds of localities in the Southern States that have no veterinary service and in which competent men may soon build up lucrative practices and be recognized as strong constructive forces.

QUACKERY

The South is well supplied with quacks and charlatans. They generally seek new pastures when a properly qualified man locates in the community. Their elimination from the field is simply dependent upon the rendering of service of which they are not capable.

The usual line of quack remedies is to be found on sale throughout the South. As is usual they fail to give the results claimed by the manufacturer. It appears to me that the legislatures of the various States should recognize in this traffic a menace to the well-being and development of the live-stock industries and pass laws placing the control of the sales of this class of preparations in the hands of State veterinarians or live-stock sanitary boards. If it is logical to require that stock foods meet certain standards, why should not the preparations sold for the treatment and prevention of diseases of animals be required to do likewise?

VETERINARY COLLEGES

The South has five institutions offering college work leading to the veterinary degree. These are: Alabama Polytechnic Institute, Veterinary Division, Auburn, Ala.; Texas Agricultural and Mechanical College, College Station, Texas; Oklahoma Agricultural and Mechanical College, Stillwater, Okla.; Georgia State College of Agriculture, Athens, Ga.; and North Carolina Agricultural and Mechanical College, Raleigh, N. C.

DISEASES MOST COMMON IN THE SOUTH

It is not the purpose of this paper to give a technical discussion of diseases but rather to enumerate and call attention to the diseases and conditions likely to be met with in this section.

Tetanus is generally believed to be more common in the South than in other sections of the country and usually of a somewhat more virulent type. It is undoubtedly more common in hogs. It is believed that the moist, warm climate is favorable to the *Bacillus tetani*.

Insanitary conditions are doubtless a factor in its causation in hogs.

"*Black Tongue*," "*Infectious Sore Mouth*," "*Southern Dog Plague*," are names applied to the most fatal disease, except rabies, with which I am familiar in dogs. The disease is manifested by inflammation followed by ulceration of the buccal mucosæ, the continuation of this inflammatory condition throughout the digestive system, by drooling of mucous saliva, high temperature, nervous depression, and constipation followed by a fetid diarrhea which is sometimes bloody. Death usually occurs in five to seven days. Some investigators have made the claim that the disease is *uncinariasis*.

I and my associates have not been able to prove this to be the case. In some instances we have found evidence of hookworm infestations but not constantly. We believe the disease is infectious but have failed to reproduce it by cultivation and inoculation. We have nothing new to offer in the way of treatment. Our fatalities have been highest among hounds and lowest among the smaller breeds, on the average in the neighborhood of 60 per cent.

"*Mad Itch*," "*Rubbing Disease*" and other names are applied to a disease of cattle found in some sections of the South. Some veterinarians believe this to be a form of hemorrhagic septicemia. Others think it a form of plant poisoning or poisoning by fungi. Mortalities are practically 100 per cent. Postmortem lesions consist of petechial hemorrhages similar to those found in septicemic conditions. This disease is one upon which there is need for considerable additional information.

Verminous Respiratory Troubles in Swine.—Lung worms, *Strongylus paradoxus*, are very common in the South and cause the death of large numbers of young pigs and shoats every year. Apparently the parasites are more plentiful during seasons of heavy rainfall. They cause chronic cough and bronchitis followed by pneumonia. Treatment for the removal of the parasites is not practicable. In the hands of the average swine grower practically nothing is done to prevent the young animals becoming infested and nothing in the way of better care and better feeding used for the relief of the animals. Sanitation appears to be the means of prevention, or at least the only means of keeping the infestation from becoming excessive.

Kidney Worms of Swine (Stephanurus dentatus).—This parasite is common in southern range hogs. It causes unthriftiness and prevents animals from making proper gains in the feed lot. It is not

nearly so common among swine kept in properly drained and rotated pastures. Here again is parasitic infestation not practical of treatment with drugs, except as a preventive measure. Better sanitation of pastures and feed lots is necessary.

Stomach Worms of Cattle and Sheep (Haemonchus contortus).—This parasite which infests the abomasum of cattle and sheep is common in many of the more poorly drained sections of the South and is also to be found in other sections in which pasture rotation and drainage are not carefully looked after. It causes the conditions known as "poverty jaw" of cattle and "paper skin" of sheep. It is a blood-sucking parasite and causes anemia, unthriftiness and general debility and is responsible for the loss of many cattle and sheep. It may be successfully treated with bluestone solution or with a combination of gasoline and raw linseed oil used as a drench and administered on three successive days on empty stomachs. Doubtless other factors enter into the losses chargeable to the parasites. These are lack of proper shelter for young animals during autumn and failure to supplement the nonsucculent pasturage of autumn with other feeds in order to keep cattle and sheep growing and thriving as during the summer months. Veterinary extension work is in many localities improving conditions along this line.

Cattle Ticks.—Systematic eradication of the cattle tick has made wonderful progress and within the next few years this parasite will have been completely eradicated and the safety of the cattle industries from this plague will be assured. Tick eradication is followed by improved quality of cattle and increased profits in all lines of cattle industries.

Other Parasitic Conditions.—Intestinal worms infesting the various species of farm animals are more common throughout the Southern States, due largely to a lack of farm sanitation and drainage and pasture and feed-lot rotation. In the swampy, open range sections hepatic distomiasis is found with its attendant reduction in vitality and unthriftiness. Pork measles and beef measles (*Cysticercus cellulosae* and *Cysticercus bovis*) are not uncommon. These infestations are of course due to lack of proper sanitation on the farm and carelessness in the disposal of human excrement.

There are many other diseases and parasitic conditions to which attention might be drawn, but in these respects the South is not unlike other sections of the country. Veterinary service is needed, badly needed, in many sections and the live-stock owners are willing and anxious to learn better methods of handling farm animals. The

boll weevil has over a great territory changed the farmer's attitude toward live stock and caused him to see and appreciate the fact that he must turn his attention to diversified farming with live-stock production as an important part of his farming operations.

The South is bound to come to be recognized as that section of the United States best adapted naturally for live-stock production. The graduate veterinarian who seeks a location in which to establish a practice or to engage in live-stock production should investigate what opportunities the South has to offer before locating elsewhere.

The Brazilian authorities are looking for a well-qualified man to take charge of the production of hog cholera serum. It is their desire that the man who is selected for this position should forward to Brazil a design for a laboratory building suitable for the purpose and arrange for the purchase of equipment in this country. When the building has been completed, he will be notified to leave for Brazil with the view of producing serum. The position is for one year, during which time the incumbent would be expected to instruct Brazilians in the technique of making serum. The salary offered is \$5,000 with traveling expenses.

Dr. R. M. Gow, State Veterinarian of Arkansas, has been granted an indefinite leave of absence to recuperate from ill health resulting from a severe attack of "flu." During his absence Dr. Joe H. Bux, inspector in charge of coöperative hog-cholera work in Arkansas for the Bureau, will act as State veterinarian in addition to his other duties.

Dr. J. P. Jacks, who has had charge of B. A. I. coöperative hog-cholera work in Arizona, resigned from Bureau service April to engage in general practice.

State Veterinarian William Moore and Dr. F. D. Owen, Inspector-in-Charge of hog cholera control, both of North Carolina, were recent visitors to the Capital in connection with coöperative eradication work in that State.

Dr. W. A. Axby, of Harrison, Ohio, and Miss Louisa S. Smith, of Chicago, were married in Chicago on March 24th, 1920. A long, happy and prosperous married life is the wish of their many friends.

POISONOUS PLANTS OF THE SOUTH¹

By E. D. KING, JR., *Mobile, Ala.*

WITH a feeling that a breeder would call a cross between pride and pleasure, gentlemen, I will attempt to present to you in my humble way the subject of poisonous plants as they are met with in veterinary practice in the South. Any veterinarian should be proud of an opportunity to address such a body of gentlemen as usually attend the A. V. M. A., and pleased at being permitted to attempt to bring to your attention a subject that is second only to a few of our worst communicable diseases.

The subject of poisonous plants has been receiving more and more attention every year by veterinarians, and, as we all know, a working knowledge of them helps materially in clearing up many knotty problems. We have a greater number of poisonous plants than most of us realize until we consult Pammel's "Manual of Poisonous Plants" and learn our local plants.

In the South we have in most localities ignorant, self-wise individuals who for various reasons are opposed to dipping cattle to eradicate the *Margaropus annulatus* or Texas fever tick, who are ever ready to blame the dipping when cattle die and the cause is not definitely known. Here, if the practitioner is called or consulted, and goes after the cause and finds no evidence of dip poisoning, but does know the local poisonous plants, is an opportunity to do some missionary work that will popularize a good cause, add to his prestige and increase his practice, by going on the assumption that a veterinarian should be able to exonerate the dip where facts are obscure and convince the owner that there is a greater possibility of plant poisoning than of dip poisoning, and go into the pasture or on the range, find and point out the poisonous plants, telling their properties and the symptoms of poisoning by them if necessary.

Poisonous plants necessarily enter into the solution of animal losses on range, in pasture and in feed lots. Hence the practitioner who is familiar with them has an advantage in arriving at his diagnosis, in that he does not have to guess whether or not poisonous plants caused the trouble.

Every practitioner and dipping inspector should be familiar enough with poisonous plants to point them out, name the poisonous substances they contain, give their common and botanical names, as

¹ Paper presented at the Fifty-sixth Annual Meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

quite often they appear in articles in the newspapers, and our replies to inquiries of clients relative to them either raise or lower us in their estimation. In this connection I wish to emphasize that this, like surgery, is far removed from the domain of the "quack," who can not survive the spotlight of public opinion tactfully directed by men who know and use the scientific facts of our profession. All intelligent stockmen know the importance of poisonous plants and lend a willing ear to intelligent discussion of their appearance and action.

In view of the foregoing the writer would suggest that every practitioner give some time and thought to this important subject, and the following beginning (for those who have not already begun) is suggested:

Get a compilation of your local flora, then get Pammel's Manual of Poisonous Plants and all other available literature on poisonous plants, including the bulletins gotten out by the Department of Agriculture and the various experiment stations. Learn the plants at sight and learn the use of the key (which many of us have forgotten). Classify all plants you run across that you don't know at sight, and in a very short time you will know all the plants in your locality and can call them by name and tell their properties. This will increase your ability to grasp the situation in live-stock losses and increase your self-confidence at the same time.

We have 261 plants more or less toxic in the South, and more than 30 that are of economic importance as they all can and some do cause losses of live stock. In view of the number and toxicity the writer would urge that every effort be made by the profession to have taught in the veterinary colleges a more thorough course in poisonous plants along with toxicology.

A condensed text to contain our most important poisonous plants, with photographs, symptoms of poisoning, treatment and precautions used, to teach botany to veterinary students where field work constitutes the most important part of the course in botany in a veterinary course, will, in the opinion of the writer, result in fewer practitioners getting on the wrong side of the fence, or rather agreeing with the faction "agin' dippin'" instead of tactfully bringing out the facts about plant poisoning, which, when properly done, will not fail to create a reasonable doubt in the mind of the layman that his pet theory is right.

I have generalized so far, as the purpose of my paper was not to tell you gentlemen what I know, but to bring to your notice this

subject in order that more work would be done along this line. And I wish to say that there are in the audience men who are much better informed on this subject than I am.

I will now describe some of our common poisonous plants.

SOLANACEÆ (NIGHTSHADE) FAMILY

Solanum Carolinense (Horse Nettle)

Roughish downy, 1 foot high, with ovate-oblong, angled or sinuate-lobed leaves, yellowish prickles and pale blue or white flowers almost 1 inch wide; a weed in sandy soil from Connecticut to the South.

According to Kraemer it contains solanin 0.8 per cent in the berries.

Symptoms would be those of a narcotic (Pammel, pp. 132, 724, 854.) Feeding experiments failed to cause death.

Treatment suggested: Saline purgatives and stimulants.

Solanum Nigrum (Black Nightshade or Stubbleberry)

Description: Annual, low branch, and often spreading; stem glabrous or hairy; hairs simple, roughened on the angles; leaves ovate, petioled; flowers white in small umbel-like drooping clusters; calyx spreading, the lobes, obtuse, much shorter than the white corolla; berries glabrous, globose, black, occasionally large (Pammel).

Poisonous properties: Solanin and solanidin.

Symptoms: Spectral illusions; delirium; dilated pupils; thirst and dryness of the mouth; incoordination. Occasionally, though rarely, there are paralysis and tetanoid spasms.

Treatment: Must be immediate. Give emetics: lavage; pilicarpin nitrate, 1/3 grain subcutem, repeated if necessary; ammonia or amyl nitrite to nostrils; tannin. Later: Stimulants; castor oil; demulcents swallowed or injected.

The black nightshade contains the alkaloid solanin, which is probably present in larger quantities in the fruit before it is entirely ripe, also solanidin with stronger basic properties. In Europe it has been looked upon with suspicion for a long time. The ancients held it in suspicion and many superstitious beliefs are connected with it. Shimpsky in discussing the poisonous and nonpoisonous properties of the plant states that the amount of poison produced depends upon climatic conditions and the character of the soil. The berries

are poisonous to ducks and chickens as well as to domestic animals and man.

On its leaves are found *Corpospora atromarginalis* and *Corpospora rigospora*. What part they play in the poisoning the writer has been unable to determine.

Postmortem lesions should be chiefly enteritis and congestion of the meninges.

Datura Stramonium (Jimson Weed or Jamestown Weed)

Habitat: All temperate and tropical regions of the globe (Mohr, 715).

Economic uses: The leaves and seeds are used medicinally (Stramonii folia and Stramonii semen of the U. S. P.—Mohr, 715).

Description: Bulletin 188, U. S. Department of Agriculture, page 37, states: "This well-known rank and ill-scented poisonous weed is an annual about 2 to 5 feet in height, and belongs to the potato family (Solanaceæ). Its yellowish-green stems are stout, leafy and much forked. The leaves are large, 3 to 8 inches long, thin, smooth, pointed at the apex and usually narrowed at the base, irregularly waved and toothed, veiny, dark green on the upper surface and paler green beneath. The rather large showy flowers are produced from May to September. They are white, funnel shaped, about .3 inches long, and have a heavy odor. The seed pod is a dry, oval, prickly capsule, which, when quite ripe, bursts open and discloses four valves containing numerous black, kidney-shaped seeds. The seeds are ill-smelling when fresh, as is the entire plant. They are dull black, about one-sixth of an inch long, flattened, wrinkled, and marked with small depressions."

Poisonous properties: Atropin and hyoscyamin, daturin being a mixture of atropin and hyoscyamin (Pammel, p. 730).

Law, Veterinary Medicine, volume 2, page 282, "Potato Family," says: "Many members of the Solanaceæ family are poisonous, but mainly through their narcotic properties. *Datura stramonium* (thorn apple) (Jimson weed), now common in the United States, proves fatal to cattle eating the young leaves with hay."

The writer has seen losses of sheep caused by the mature plant, the sheep eating the leaves, bark, flowers, etc. Treatment was not attempted. Sheep were removed to another pasture and losses ceased.

Alabama Experiment Station Bulletin No. 185, page 55, says: "Young cockle burs are said to be poisonous to pigs, but our feed-

ing tests disprove it. We could not kill pigs by feeding them young cockle burs. Jimson weeds grow with cockle burs, and Jimson weeds are very poisonous."

Symptoms: Spectral illusions, delirium, dilated pupils, thirst and dryness of the mouth, incoordination. Occasionally, very rarely, paralysis and tetanoid spasms. (Pammel, pp. 4, 60, 61, 74, 88, 133.)

Treatment—Immediate: Emetic and stomach tube; pilocarpin, 1/3 grain subcutem, repeated if necessary; ammonia or amyl nitrite to nostrils. Later: Stimulants; castor oil; demulcents swallowed and injected.

POLYGONACEÆ FAMILY

Rumex Acetosella (Sheep Sorrel)

Common in light, sandy soils, waste places and worn-out fields. An abundant and troublesome weed. Annual. (Mohr, p. 481.)

This plant is widely distributed in the United States and is becoming more common. Said to be poisonous to horses and sheep. Contains oxalic acid. (Pammel, p. 106.)

CARYOPHYLLACEÆ OR PINK FAMILY

Stellaria Media (Chickweed)

Description: A nearly smooth annual or winter annual, decumbent or ascending; leaves ovate or oval, the lower on hairy petioles; flowers white in terminal leafy cymes or solitary in the axils; sepals oblong, longer than the 2-parted petals; stamens 2 to 10.

Distribution: A weed in waste places, lawns and fields, naturalized from Europe. Extends from New England to Canada across the continent.

Poisonous properties: The seeds of common chickweed are used as food for cage birds and are also readily eaten by chickens, but according to Mr. William Carruthers they cause digestive disorder when eaten by lambs in large quantity.

Lychnis Githago (Corn Cockle)

Poisonous principles: Saponin, sapogenin and the alkaloids agrostemmin and githagin (Pammel, p. 108).

Description: Calyx long with leaf-like lobules, petals not crowned; hairy with long linear leaves, and long peduncled, showy, red purple flowers; in fruit the calyx lobes falling off. A weed in grain fields, the black seeds injurious to the grain. (Gray, p. 75; Pammel p. 197.)

Habitat: Grain fields, generally wheat, although the writer has seen it in oat fields in France almost to the exclusion of the oats.

Screenings are often sold as stock food and several cases of poisoning have been recorded. (The writer has found quantities in oats being fed to Army animals and the animals nearly all showed "lampas." No reason could be found for the trouble, and screening the oats relieved the lampas in a few days.)

Difficulty in screening wheat by ordinary methods has caused the weed to be generally scattered in wheat-growing regions. Farmers often sow cockle with their wheat.

The seeds are used to adulterate the cheaper grades of flour in Europe, and the following cases of poisoning are on record:

Dr. Millsbaugh gives a case of death by feeding 10.5-ounce lots of wheat flour containing 30 per cent and 45 per cent of these seeds to two calves. These amounts of cockle caused severe cramps of the stomach within an hour, followed by diarrhea and finally death.

Where ducks and geese ate the seeds in sufficient quantity death followed, and postmortem examination showed inflammation of the bowels. Prof. Pierce thinks that crushing enhances the toxicity of the seeds. A large amount of screenings is sold as chicken feed and the chickens either refuse to eat it or are poisoned. Both kinds of complaints are made.

Dr. Allen places the seeds among cerebrospinal irritants.

Dr. Chesnut says: The poisonous constituent, saponin, is a non-crystalline powder very feebly soluble in water, and possessing a sharp, burning taste. It has no odor but when inhaled in the smallest quantity it produces violent sneezing. When briskly shaken with water it froths like soap. The poison is found in nearly all parts of the plant but mainly in the kernels of the seed. Cases of the poisoning have been found among all sorts of poultry and household animals, but are rarely due to any part of the plant as found growing in the field. The poisoning is generally produced by a poor grade of flour made from wheat containing cockle seeds. Machinery is used to remove these seeds from the wheat, but the difficulty of separating them is so great that the result is not entirely accomplished. The quantity remaining determines the grade of flour in this particular regard. It sometimes amounts to 30 or 40 per cent, but this quality is only sent out by ignorant or unscrupulous dealers, or is intended for consumption of animals only. Flour containing a smaller amount has often been made into bread and eaten, sometimes with fatal results, the baking not always being sufficient

to decompose the poison. The effect may be acute, or if small quantities of the meal are eaten regularly, it may be chronic. In the latter case it is sometimes known as a disease under the name of githagism.

Symptoms (in man): Intense irritation of the whole digestive tract, vomiting, headache, nausea, diarrhea, hot skin, difficult locomotion, and depressed breathing. Coma is sometimes present and may be followed by death. Chronic poisoning in man has not been closely studied, but experiments upon animals show chronic diarrhea and gradual depression, the animal losing vigor in breathing and in muscular movement until death ensues. The action is antagonized by digitalin or the simple extract of *Digitalis purpurea*.

Symptoms (in animals): Colic, vomiting (in those capable of regurgitation), ptialism, stupor, hyperemia of brain and spinal cord. (Pammel, p. 440.)

Silene Antirrhina (Sleepy Catchfly, Forked Chickweed)

Distribution: New England, West and South.

Not of toxic importance, but secretes an adhesive substance that catches small poultry and will hold them until they die unless they get help. This gum is commonly found on the small branches, so that every move the little birds make brings them in contact with it by their plumage, which is fine and readily sticks to the branches, and fastens them more firmly until it is impossible for them to get free.

This plant is mentioned because the writer has been called to investigate losses of young chickens, and found this trouble.

Control: Eradicate the weed.

ANACARDIACEÆ FAMILY

Rhus Toxicodendron (Poison Oak or Poison Ivy)

Does not affect mucous membranes, but irritates the skin. Several members of this genus are violent irritants to the skin, but as a factor in losses of live stock the writer believes it to be unimportant.

EQUISETACEÆ OR HORSETAIL FAMILY

Description: Stem perennial, tall and stout, 8 to 10 feet high, sometimes an inch thick, occasionally branched: 20-48-grooved, the ridges roughened with lines of transversely oblong tubercles, the central cavity large, sheath rather long, cylindrical, marked with a black girdle, their ridge obscurely carinate; spikes persistent.

Distribution: Mountain regions adjacent to Mississippi Valley and Missouri River Valley. The writer believes that it occurs also in low lands and is slightly different from the upland varieties.

Poisonous properties: The rushes have been long recognized in Europe as being injurious to horses, and there are records of their poisonous properties in American agricultural literature.

Symptoms: The first evidence of the trouble is unthriftiness and emaciation. In from 2 to 5 weeks, according to the age of the animal and the manner of feeding, the animal begins to lose control of its muscles, sways and staggers like a drunken man; his eyes may look bright and he may even try to caper and play.

Friedberger and Frohner give the symptoms as follows: "At first excitement and anxiety, the sensorium remaining unaffected; later, uncertainty of movement, reeling and staggering; at least paralysis of hind limbs, tumbling down, general paralysis, insensibility to external irritants, unconsciousness and coma. Pulse accelerated; appetite at first normal, but in course of time great disturbance of nutrition; sugar in urine. Course sometimes very acute, death occurring in a few hours, but sometimes protracted 2 to 8 days, and sometimes chronic (1 to several weeks). In cattle, after excessive eating, continuous diarrhea becomes a prominent symptom along with the paralytic symptoms; while if the food is persisted with, cachexia and hydremia, edema, dropsical effusions on the brain and spinal cord, especially on the cerebellum; in cases of longer duration, hydremia, sometimes inflammatory changes in the mucous membrane of stomach and bowels.

"Therapeutics: Change of fodder; purgatives and stimulants, especially camphor; blisters along the spine."

There is no doubt that this plant causes a great deal of trouble, but to what extent is not known, as many haystacks examined contained the rattlebox in considerable quantity. (Pammel.) (The writer assumes that by rattlebox is meant *Crotalaria sagittalis*.) Horses eating this hay suffered from the combined effect of both poisonous plants.

Summary: Young horses suffer more than old ones and are more apt to die. Grain feeding adds to the resistance of the animal. Horses develop a depraved appetite for the weed. The plant is less harmful when green than when cured with hay. The poisonous principle is believed to be silicon, and Matz and Ludwig say aconitic acid.

Summarizing the treatments mentioned, the following seems to be of most value:

Aloes barb., oz. 1
Zingiberis pulv., drs. 2
Sapo. mollos., q. s.
Mx. ft. boli No. 1

Sig.: Give at once, and feed bran mashs until digestive tract is cleared.

After the physic has operated give the following:

Nucis vomicæ sem. pulv., drs. 6.
Sig.: Give 1 dram in each feed.

MALVACEÆ (MALLOW) FAMILY

Modiola Multifidis (Ground Ivy)

Description: A small creeping herb; flowers red, about $\frac{1}{2}$ inch broad; leaves $\frac{3}{7}$, cleft and cut, or the earlier ones rounded and undivided; fruit hairy at the top.

Distribution: Over entire South.

This plant is not listed as poisonous, and one physician related having seen poultices made from the leaves and stems and applied to wounds; but the writer has seen goats, sheep and cattle poisoned by it where there was little doubt as to the cause.

Symptoms: Incoordination and prostration. Goats will lean over to one side with the hind part, the front legs apparently unaffected. Cattle and sheep show symptoms of nervous disturbance and die in convulsions.

Treatment: Strong coffee has given the best results in the experience of the writer. The quick relief given by the coffee treatment seems to point to the elimination of the toxic substance by the kidneys. No literature is available on this plant. According to Mohr the *Cercospora althaeina* (Alabama Bulletin 141 and Cornell Bulletin 43) is found on the leaves of this plant. These organisms may cause the trouble. But trouble is caused when it is eaten.

OTHER PLANTS

Owing to the lack of time and space the following poisonous plants will be mentioned briefly. Those of toxic or medicinal importance are marked with an asterisk.

**Ricinus communis* (castor oil plant). Poisonous principle, ricin.

**Andropogon halipensis* (sorghum). Poisonous principle, hydrocyanic acid.

**A. sorghum* (sorghum). Poisonous principle, hydrocyanic acid.

**A. arundinaceus* (*Sorghum halipensis*, Johnson grass). Poisonous principle, hydrocyanic acid.

RANUNCULACEÆ (CROWFOOT) FAMILY

**Ranunculus sceleratus* (cursed crowfoot). Acrid poison and violent irritant.

**R. abortivus*. Irritant.

IRIS FAMILY

**Iris versicolor* (large blue flag). Irisin or iridin (irritant), emetic and cathartic.

I. variegata. Poisonous principle not known.

LOGANACEÆ (LOGAN) FAMILY

Gelsemium sempervirens (yellow jessamine). Poisonous principle, gelsemin (flowers rat poison).

APOCYNACEÆ (DOGBANE) FAMILY

**Vinca minor* (common periwinkle). Astringent poison.

GERANIUM FAMILY

**Oxalis corniculata* v. *stricta*. Antidote for stramonium poisoning.

**Lolium temulentum* (darnell, rye grass). Poisonous principle, loliin.

BIGNONIACEÆ FAMILY

Tecoma radicans (trumpet vine). Narcotic.

MELIOCEÆ FAMILY

Melia azedarach (China tree). Poisonous principle, mangrovin.

ERICACEÆ (HEATH) FAMILY

**Kalmia latifolia* (calico bush, mountain laurel). Poisonous principle, andromedotoxin.

**K. angustifolia* (sheep laurel, lambkill). Narcotic.

PULSE OR LEGUMINOSÆ FAMILY

**Robina pseudocacia* (black locust). Poisonous principle, robin, a toxalbumen.

**Crotalaria sagittalis* (rattlebox). Inebrient.

Cercis canadensis (American redbud). Poisonous principle, saponin.

Cassia marilandica (wild senna). Poisonous principle, saponin.

C. occidentalis. Purgative.

ROSACEÆ (ROSE) FAMILY

**Prunus serotina* (cherry tree). Poisonous principle, glucoside containing HCN.

**P. caroliniana* (cherry tree). Poisonous principle, glucoside containing HCN.

**P. virginiana* (cherry tree). Poisonous principle, glucoside containing HCN.

**P. persica* (peach tree). Poisonous principle, glucoside containing HCN.

MADDER FAMILY

Diodia virginiana. Poisonous principle, cumarin, used to adulterate smoking tobacco.

UMBELIFERÆ (PARSLEY) FAMILY

**Cicuta maculata* (poison hemlock). Poisonous principle, cicutoxin.

**Conium maculatum* (water hemlock). Poisonous principle, coniin.

Many of the foregoing should have been treated more fully, but time and space prohibit. They are given in such shape that they can be looked up in the different text-books.

Helenium autumnale or sneezeweed is one of our most common and fatal plants in the South, causing losses of many animals and escaping suspicion in many cases. The poisonous principle was extracted by Doctors I. R. Pollard and W. M. Williams, but not named so far as the writer knows. Its action is similar to that of aconite. It is commonly found in hay and other forage, and a small amount will prove fatal.

ADDENDA

Nerium oleander (oleander). Cathartic.

**Eupatorium agertoides* (white snake root). Poisonous principle not known; causes milk-sickness.

**Aesculus glabra* (fetid buckeye). Poisonous principle, saponin.

**A. octandra*, s. *flava* (yellow buckeye). Poisonous principle, saponin.

**A. pavia* (red buckeye). Poisonous principle, saponin.

Poisoning by the buckeyes seems to respond best to treatment with oleaginous purgatives.

The North Carolina Experiment Station has recently published a bulletin (Technical Bulletin 15, July, 1918,) that deals at length with *Eupatorium agertoides*, and it is suggested that this bulletin be read by those in sections where this plant is common.

Professor William Herbert Lowe of New York University offers an annual prize of \$100 in Animal Husbandry and Animal Industry at the New York State Veterinary College, New York City. This prize will be instituted with the session of 1920-21, and is open to competition to fourth year men under conditions prescribed by a board of examiners consisting of the animal husbandmen of New York, New Jersey and Connecticut.

Announcement is made that one of the New Jersey scholarships established by the veterinary profession of that State at the New York State Veterinary College, New York University, New York City, will be available for the 1920-21 session.

Drs. W. K. Lewis and Hartwell Robbins, inspectors in charge of tick eradication in South Carolina and North Carolina, respectively, were recently summoned to Washington for a conference regarding the commencement of their spring activities.

NUMBERS AND VALUES OF FARM LIVE-STOCK IN CANADA

Farm Animals	1918	1919	1918	1919	1918	1919
	Number	Number	\$ per head	\$ per head	Dollars	Dollars
Horses.....	3,609,257	3,667,369	127	119	459,155,000	435,070,000
Milk Cows.....	3,538,600	3,548,437	87	92	307,244,000	327,814,000
Other Cattle....	6,507,267	6,536,574	61	58	398,814,000	381,007,000
Total Cattle..	10,045,867	10,085,011	70	70	706,058,000	708,821,000
Sheep.....	3,052,748	3,421,958	16	15	48,802,000	50,402,000
Swine.....	4,289,682	4,040,070	26	25	112,751,000	102,309,000

(Dominion Bureau of Statistics.)

SHEEP PRACTICE¹

By E. T. BAKER, *Moscow, Idaho*

JOHN SMITH, a good client of yours, has a small bunch of sheep. Kept in rather artificial surroundings, several become sick, and you are called out. After you examine the suffering animals, thoroughly puzzled, you say to Mr. Smith:

"I don't know much about sheep, and I really do not know what is the matter with them."

With a disgusted air he calls up the county agent, who has a smattering of animal husbandry, an ultra-microscopical amount of veterinary science, and who has read over a few books relating to sheep. He comes out to Mr. Smith's ranch.

"Ah! Shropshires," beams Mr. George W. Agent. "Fine type of the breed," he adds.

Mr. Smith glows with pride. Why, that veterinarian didn't even know what breed they belonged to, much less the fact they were blue-ribbon winners at the Podunk County Fair. At last he has found an expert who knows value when he sees it. The county agent has gained his confidence; also, the veterinarian has lost it. The report soon sweeps over that community:

"Doc K—— is all right fer sick hosses and cows and pigs, but he don't know beans about sheep."

To resume: Mr. Agent does not admit how little he knows, but he makes a stab in the dark, and recommends a change of food and some salts; and, strange to say, the sheep recover. The veterinarian has lost the sheep practice in that community; not much, to be sure; but ten years ago how many of you ever dreamed that swine practice would be the money-maker of today?

Therefore, as veterinarians, you should, first of all, read up on the history of sheep; be able to recognize the common breeds, and acquire a working knowledge of the ones kept in your vicinity. Such books as Coffey's "Productive Sheep Husbandry," Kleinheinz's "Sheep Management," Pammel's "Manual of Poisonous Plants," Bowman's "Wool Fibre," Plumb's "Types and Breeds of Farm Animals," Henry's "Feeds and Feeding," Dooley's "Textiles," are very helpful, in addition to the works written by veterinarians. Periodicals, such as the *American Sheep Breeder*, a monthly magazine, published at Union Stock Yards, or the *National Wool Grower*, published at Salt Lake City, keep one posted on current events in wool circles.

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

Hygiene or sheep management embraces a number of important things, enabling one to talk intelligently to an experienced sheep breeder. You should know how to restrain a sheep for examination; various foods necessary for ewes, lambs or bucks; beneficial licks; care of sheep, either in a band of a thousand or a dozen; be up on the general care of sheep, as regards exercise, food and water, and quarters.

Your knowledge of anatomy should enable you to determine the age by the teeth; locate the suborbital and interdigital glands; how to destroy a sick sheep by deftly cutting its throat, and to perform a creditable autopsy. A general knowledge of the digestive tract will help you in a tentative prognosis, for many sheep die getting well, and many as sick-looking as a cow with milk fever recover. Physiology enables one to judge whether the trouble is due to lack of natural care or not, and merely a working knowledge is necessary. One need only have a very little ovine anatomy and physiology to carry in his mental grip, but what little he possesses should be always on tap.

Next come the common medicines used in sheep work, their indications, dosage and administration. Emergency treatment should be emphasized, for often one is far from medicines, and ordinary kitchen remedies must be substituted. Biologicals are highly useful in ovine troubles, and they should be used more than they are.

Then come miscellaneous subjects, such as postmortems, preparing specimens for laboratory examination, expert testimony in law suits, quarantine work, and contagious disease control work. Can you perform these with satisfaction to your clients and yourself and to the general good of the public?

And last, but not least, comes the subject of sheep diseases. For convenience, in order to classify them so they are easily remembered, the writer divides them into the following divisions:

1. Infectious diseases. The ones commonly found in this country in sheep are hemorrhagic septicemia, anthrax, blackleg, tetanus, lip and leg ulceration or foot rot, rabies and septicemia. We should be able to diagnose in a tentative manner rinderpest, variola and foot-and-mouth disease, for we do not know when these may invade our country.

2. Parasitic infestation. This is a very important thing, for parasites work havoc among sheep, and it is very embarrassing to diagnose tuberculosis in sheep when they are affected with stomach worms. One should have a working knowledge of the principal external parasites, such as scab mites, ticks and maggots, and of the

internal ones, as gid, lung worms, stomach worms, liver flukes and tapeworms.

3. Plant poisoning. This is especially important out in the western sheep country, and every winter thousands of pregnant ewes succumb to forage poisoning. We should be able to identify the common poisonous plants in our vicinity, distinguish molds and fungi in feeds, and prescribe suitable treatment.

4. Noncontagious diseases, mostly due to errors of diet, lambing troubles in ewes, gravel and impotence in the buck, diarrhea and constipation in the lamb.

In other words, when you are called to see John Smith's sick sheep, you can keep this simple classification in mind. If the animals do not exhibit clinical symptoms of a contagious ailment, then it may be due to parasites; if you can eliminate these, perhaps it is due to some poisoning in the feed or water; if this seems absent, then it must be a noncontagious ailment, of which there are legions. But in all cases give a very broad diagnosis, so that you have a second and even third line of trenches to fall back on.

If the case is puzzling, do the following things: Separate the apparently healthy from the sick; give a complete change of feed and water; destroy one of the hopelessly sick ones and perform an autopsy; if at all possible, pack the whole pluck in ice and send it to a laboratory, and give the sick ones something; those that recover will be credited to you. Above all things, do not stand around in a hopeless manner, thereby causing the owner to lose confidence in you. Do something: keep the owner and his help busy; be cheerful; tell the owner to prepare for the worst, but that you will do all you can.

Does it not give you a feeling of time well spent to be able to handle sheep disease outbreaks in the manner above described? Show to your clients that you understand sheep and their ailments, as well as their care and management in health, and it will not be long before your sheep practice will develop wonderfully.

Go along in your old rut, dismiss sheep without a thought, and many dollars will go by on the other side. Many good clients are won by being able to prescribe for a pet lamb, and it behooves the veterinarian of today to be up on this subject.

As practitioners—and the writer is a practitioner himself—what we want is results, and this little paper is written to help the profession in general to attain successful results. Be prepared in a general way, and success will follow.

SNUFFLES (CONTAGIOUS NASAL CATARRH) OF RABBITS; ITS ETIOLOGY AND TREATMENT

By H. PRESTON HOSKINS,

Research Laboratories, Parke, Davis & Company, Detroit, Mich.

WITHIN recent years the rabbit-raising industry in the United States has become one of immense proportions. There are quite a number of reasons why rabbit breeding and raising appeals to the average individual, and as a consequence we find a number of rabbitries in practically every locality, in our large cities, small towns, and even in the country districts. The utilization of rabbits as a source of meat has been a common practice in some foreign countries for many years, but only within recent times has this phase of rabbit raising attracted attention in this country. Rabbits were raised to be sold as pets, or for use in laboratories as experiment animals.

Rabbits are very prolific breeders and the young rabbits from good stock mature very rapidly. They require a minimum amount of space, much less than chickens, and are easier to raise. In fact it is somewhat surprising how thrifty some rabbits will be in what we would ordinarily consider cramped quarters. When properly cooked, rabbit meat is very palatable, and it might easily pass for chicken. The pelts have a market value if carefully removed and dried.

At the present time rabbit breeders are experiencing considerable trouble with a disease which is generally called "snuffles." It is also designated "cold," "catarrh," "distemper," and even "flu." It is characterized by disturbances of the respiratory tract, marked chiefly by a nasal discharge which varies in amount, color and consistency in various stages of the disease. Affected rabbits sneeze at frequent intervals, resulting in the discharge of considerable nasal mucus. There is apparently some irritation of the nasal passages, as the sick rabbits are seen to rub their noses with their front paws, evidently to alleviate this irritation. As a result of using the paws for rubbing the nose, the former are much soiled and the fur badly matted by the nasal discharges. Other parts of the body may become soiled, resulting in an untidy appearance. On the other hand, some rabbits, even though affected for months, will maintain a sleek, thrifty appearance.

Snuffles is not usually a fatal disease. Some rabbits will make spontaneous recoveries. A second attack, following a complete

recovery, is rare. In some cases the disease persists for six months, if untreated. There will be intervals when the symptoms subside and almost disappear, only to recur a few days later. Damp, humid weather seems to aggravate the condition.

There seems to be no age when rabbits are most susceptible, although the disease and the conditions attending it are such as to make it appear that young rabbits contract the disease most readily. Mature rabbits coming from a rabbitry where the disease has not existed to one where the infection is prevalent frequently show symptoms a short time after introduction. From observations thus far made under natural conditions, and not controlled by artificial exposure tests, the incubation period varies from one to three weeks. The disease is not rapidly contagious. Young rabbits from the same litter, even if kept together and equally exposed to infection, will not all develop the disease at the same time, but will show first symptoms at variable intervals.

There appears to be quite a little difference of opinion among rabbit breeders upon several points in connection with snuffles. Whether the disease called snuffles is one distinct pathological entity, or whether there are two or more diseases with about the same train of symptoms, is open to discussion. Some rabbits will die rather suddenly, after having the disease for some time. These rabbits show acute symptoms, such as marked depression and quickened breathing, and frequently die within 24 to 36 hours. Usually a pneumonia will be found at autopsy.

Rabbits killed while suffering from chronic snuffles, for the purpose of studying the pathological changes incident to the disease, show practically nothing of significance except in the nares and nasal sinuses. Here we find the nasal mucous membrane congested and covered with a secretion varying in consistency from a sero-mucous to a muco-purulent nature. In the sinuses proper this secretion is frequently found in an inspissated condition, forming casts. The lower respiratory tract shows little or no change beyond congestion, except in those acute cases, already referred to, where a pneumonia sometimes supervenes.

Ferry and the present writer (1) have made a study of the bacteriology of the disease. These investigations would seem to indicate that more than one microorganism plays some part in the affection. Cultures made by introducing a sterile swab into the nostrils of sick rabbits, or direct from the nasal passages, trachea and heart blood of rabbits dead of the disease, or killed for autopsy

purposes, have yielded the following organisms most consistently: *Bacillus bronchisepticus*, *Bacterium lepi-septicum*, *Staphylococcus albus*. Besides these three organisms various others are found in the nares, but without any regularity. They are not found in the trachea or upper nasal passages, but only in those rabbits examined alive, by passing a swab into the nostrils. It is quite likely that all such organisms are accidental invaders, probably having been inhaled with dust and of little importance from an etiological standpoint.

The first-named organism, *Bacillus bronchisepticus*, is now regarded as the causative agent of canine distemper, based on the investigations of Ferry (2), McGowan (3), and Torrey and Rahe (4). The organism has been isolated from dogs suffering with distemper, pure cultures being obtained from the respiratory tract and from the blood. In a more recent publication Ferry (5) states: "It is also of interest to know that this microorganism is known to produce a disease somewhat similar to distemper in other animals, such as the rabbit, guinea pig, cat, monkey, ferret, and likewise in a few cases in the human subject." Hoskins and Stout (6) have found the same organism to be the cause of a respiratory infection in white rats, having somewhat the same clinical picture as snuffles in rabbits.

The next most frequently found organism is *Bacterium lepi-septicum*, a member of the hemorrhagic septicemia group, previously isolated by several investigators and given different names. It is of more than passing significance that the rabbit septicemia organism should be found at this time to play a part in a widespread disease of rabbits, when hemorrhagic septicemia of cattle, sheep and hogs is receiving so much attention. Just as these organisms are found in the tissues of apparently healthy cattle, sheep and swine, so do we find them in apparently healthy rabbits. The assumption is that they become pathogenic under certain conditions, not well defined, but in a general way tending to lower the resistance of the host harboring the organisms.

The third organism found quite regularly in the nasal passages is *Staphylococcus albus*. It is quite likely that this organism is a secondary invader, but probably responsible in no small degree for the chronicity of the disease. In the very early stages the nasal discharge is watery. Later this becomes thicker in consistency and white, creamy or grayish yellow in color, probably due to the invasion and multiplication of the staphylococci in the diseased tissues.

The treatment of snuffles offers a real problem. Reports received from rabbit breeders state that many and varied forms of medication have been employed, but without satisfactory results. Agents of many different sorts have been employed for internal administration, nasal sprays, and hypodermic injections. The latter include serums and vaccines of various sorts, found upon investigation to have been suggested by physicians and veterinarians, on account of the similarity of snuffles with certain other diseases, such as canine distemper or chronic nasal catarrh of man.

The primary object of this paper is to call the attention of veterinarians to the disease of rabbits which is generally called snuffles. That there is an undeveloped field in this direction can not be questioned. Case after case has come to the attention of the author where a veterinarian had been called in by a rabbit breeder for the purpose of giving advice on the control of the disease, and almost without exception the veterinarian would say that he knew nothing about rabbit diseases, a frank confession, it must be admitted. That the rabbit breeder is anxious, even insistent, that somebody come to his assistance, is evidenced by the receipt, almost daily, of letters from different parts of the country, inquiring for some remedy for snuffles.

In the absence of any specific remedy, these rabbit breeders have tried anything and everything that overanxious friends would suggest. Some of the remedies that have been tried border on the ridiculous. The more observant breeder has noted the fact that hygienic quarters for his rabbits mean less disease. Here is a chance for the veterinarian to be of very great assistance in the role of sanitarian. He can render advice on such fundamental points as feeding and housing, especially light and ventilation, and the value of regular cleaning and disinfection of the hutches. He should have a knowledge of the various breeds of rabbits and know enough, at least, not to pick up a valuable animal by the ears. Unless veterinarians do pay some attention to rabbit practice, this work will get away from them, and it will be a difficult matter to get it back. We will hear criticisms such as we heard a few years ago concerning swine practice, namely, that remedies were being sold to and used by the laity, the veterinarian being overlooked.

Due to the fact that snuffles has all the appearances of an infectious and contagious disease, and the fact that bacteriological examinations of rabbits affected with the disease, made at different places and by different workers in the past, show a somewhat constant

combination of pathogenic organisms present, attention has naturally been turned to the possibilities of preventing and curing the disease with a specific biologic agent. A bacterin containing the three organisms previously mentioned has been the basis of some experiments to treat the disease. This work has been under way for some time, with rather encouraging results, and a report of the results following such treatment of the disease will be published at a later date.

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Dr. S. W. McClure, a former inspector of the Bureau of Animal Industry and more recently Secretary of the National Wood Growers' Association and editor of its official magazine, has resigned his latter positions to engage more actively in the sheep-raising business on his Idaho ranch. The murder of his partner by bandits was the immediate cause of this action. Dr. McClure will be succeeded by Prof. F. R. Marshall, for many years connected with the Animal Husbandry Division of the Bureau of Animal Industry.

Dr. Cassius Way, formerly Chief Veterinarian for the Borden Condensed Milk Company, has recently sent out his professional cards announcing the opening of his new offices in New York City, where he will specialize in milk sanitation, dairy herd efficiency, and breeding diseases of cattle and horses.

CLINICAL AND CASE REPORTS

ACUTE TOXIC GASTRO-ENTERITIS

By I. B. BOUGHTON, *Assistant in Animal Pathology,*
University of Illinois

The cases discussed in this report occurred in a herd of 89 light draft horses shipped to Champaign, Ill., for the military department of the University, from Camp Grant, Rockford, Ill., a distance of approximately 125 miles.

The animals arrived at Champaign March 13, 1920, after 36 hours on the train without food or water. Immediately after the horses were unloaded they were walked to the barn on the University grounds, a distance of about 2 miles. Upon arrival at the stable the animals were given a full feed of oats and hay and allowed as much water as they would drink. Aside from a few of the animals appearing tired and fatigued from the journey, nothing else was noted.

On March 14, the next day, a bay gelding died before veterinary assistance could be summoned. According to the attendants, the horse presented the symptoms of a spasmodic colic, except that there was a continued straining and frequent defecation of watery feces. Another bay gelding died at noon, March 14, just as the writer arrived at the barn. This animal, according to the caretaker's statement, exhibited the same symptoms as the first fatal case. The clinical illness in both of these animals had apparently not been over two hours' duration.

Symptoms.—On inspection several animals presented a fatigued, sleepy appearance. The lower lip was pendulous, the eyes nearly closed, the ears drooping, and some animals were either lying down or leaning against the stall-side. The temperature was normal; respiration greatly increased and very shallow, 18 to 20 per minute. Pulse very weak and slow, 34 to 36 per minute. The pulsations in the submaxillary artery of the animals affected were detected with difficulty.

The visible mucous membranes were cyanotic in most of the cases and more pronounced as the disease progressed. The extremities and tips of the ears were cold. The area about the rectum extending downward on the legs and tail were spattered and stained with watery feces. The appetite was indifferent, yet the diseases

as observed in the two animals which terminated fatally did not impress the writer as being serious or fatal.

Diagnosis.—A clinical diagnosis of an acute toxic gastro-enteritis was made. The differentiation between enteric disturbances of this character and a spasmodic colic was easily made from the appearance of the animals and the continued passing of the feces.

Postmortem.—The thoracic cavity was normal. No pleural adhesions were found, and no fluid was found in the cavity. The apices of the lungs showed a passive congestion. The heart was normal except for a few petechiæ scattered around the apex.

The abdominal cavity contained no fluid and the peritoneum was normal. The stomach was actively congested in the fundus and pyloric portions. A rather severe active congestion extended throughout the entire length of the small and large intestines. The mucous membrane lining was roughened and broken in spots. The cecum was slightly congested around the ileo-cecal and ceco-colic valves. The kidneys, ureters and bladder were normal. The spleen was enlarged to some extent and actively congested. Many petechiæ were found on the visceral surface of this organ. The liver was only passively congested.

These results were found on postmortem of the first animal that died. The postmortem findings on the other three animals that died were so nearly the same as those given above that detailed description of them is not considered necessary.

Treatment.—All of the animals were given 1 pound of magnesium sulphate (Epsom salt) in water, in an effort to cleanse the digestive tract. After a delay of two days all the animals were given subcutaneously 2 mls of a gastro-enteritis bacterin, including *Bacillus paracolon*, *Bacillus paratyphoid*, Gartner's bacillus and *Bacillus coli* of equine origin. The same treatment was given on the fifth day.

Results.—During the course of the disease in this stable two more animals died, one on the third day, presenting the same symptom-complex as the two previous animals. The fourth fatal case, a bay gelding, lingered for 10 days before death occurred. This horse showed the same symptoms in a milder form and gradually weakened.

Course.—The course of the disease extended in the 3 acute cases over a period of about 36 hours, and in the case of the fourth animal over a period of 10 days.

Cause.—The predisposing cause of losses of this character are

attributed to exhaustion, incident to being loaded in crowded stock cars for 36 hours without exercise, food or water. Direct cause was probably of a microbial nature, as discussed by Graham, Reynolds and Hill in the January, February and March issues of the JOURNAL of the American Veterinary Medical Association.

ABDOMINAL WOUNDS WITH PROLAPSE OF INTERNAL ORGANS¹

By K. W. SCHALK, *Iowa Falls, Iowa*

Wounds of this nature are frequently met with in country or city practice, and demand prompt and thorough treatment if we are to expect results. While some of the cases encountered appear hopeless at first sight, yet the results that we frequently obtain cause us to give a more favorable prognosis than formerly.

One of the first cases called to my attention occurred in a gray mare 7 years old. The owner lived 9 miles from town, but having witnessed the accident, lost no time in summoning aid, so that I was able to treat the animal very shortly after the injury occurred. This mare fell on an iron bar used by the owner to close a doorway. The bar was not pushed completely back, about one foot projecting. The animal inflicted a wound on the left side of the abdomen, more ventral than lateral. The skin wound was 18 inches in length and the wound in the peritoneum was ten inches in length, but was covered by the left ventral colon, which did not prolapse to any great extent.

Treatment was applied as follows: Washed and irrigated wound thoroughly in standing position, then placed antiseptic pack over wound in peritoneum, and drew a folded sheet around the body very tightly. Animal was cast, anesthetized, and peritoneum was sutured with chromic catgut, without any further treatment to this part of the wound or intestines. Muscle wound was trimmed, sponged, and sutured with sterile silk, using an interrupted suture. Skin was sutured, leaving opening for drainage at dependent portion, but no gauze or drainage tube was used, as location of the wound favored drainage. Covered the wound with an antiseptic pack, and held this in place with a sheet drawn very tightly around the body. Gave 10 mls of sterile camphorated oil intravenously. Advised the owner to change the pack daily, feed the animal a

¹ Presented at the thirty-second annual meeting of the Iowa Veterinary Association, Des Moines, Iowa, January 13-15, 1920.

light laxative diet, withholding water to a certain extent and also keep the animal standing.

I visited the animal again in 7 days and found no edema and very little discharge. The wound was washed, cleaned and examined through the dependent opening, and the owner was instructed to cleanse the wound with antiseptic solution daily. The sheet was kept around the body of the animal for two weeks, as I was afraid the movements of the animal would place too great a strain on the sutures. A hernia developed about the size of a man's fist, otherwise there was a splendid recovery.

My next case occurred in a 5-year-old mule, which was injured by being run into by a large team hitched to a coal wagon. The mules were standing on the right side of the street near the curb when the runaway team came directly toward them, causing the mules to swing out into the street, with the result that the tongue of the coal wagon perforated the abdominal wall of the right mule on the right side in the central portion of the flank, producing a wound 9 or 10 inches in length, half-moon shaped, with the opening of the moon dorsal and posterior. The wound in the peritoneum was 6 to 7 inches in length. Upon arrival I found the mule had been unharnessed and was standing with about 5 feet of the small intestines protruding. As the barn was only two blocks away, I ordered the animal taken there, which was accomplished without difficulty.

Treatment was applied as follows: I set about at once to replace the prolapsed portion, cleansing the wound and portion of intestine protruding with bichloride solution. I found that I could not accomplish replacement alone, and called for volunteers. With the aid of another man I accomplished replacement, allowing him to assist by the use of cotton sponges. As the animal behaved so nicely, and the position of the wound being favorable, I decided to suture the wound without casting or anesthetizing, so proceeded to trim and cleanse the muscle wound, then sutured the peritoneum and muscles with sterile silk thread, using an interrupted suture, and leaving about an inch of the wound open at dependent portion for drainage. Sutured the skin in the same manner, leaving opening in it also, then packed opening with sterile bichloride gauze. Painted line of suture with tincture of iodine, and released animal, tying so recumbency would be impossible. Withheld feed for 24 hours, then fed a light laxative diet, keeping the bowels loose by use of oils. Used camphorated oil hypodermically once

daily, and changed dressing twice daily. Was forced to make a dependent opening for drainage about 4 inches below original wound. Considerable edema was present, but was of no consequence, as animal never missed a feed. When put to work again, animal seemed none the worse for the experience and has been working on the streets daily.

I have had five cases similar to those described, and have treated all in much the same manner, with recovery in all cases. In all such wounds I prefer to do all irrigating and cleansing of intestines in upright position, leaving only the muscle wound to be trimmed and cleansed after casting and anesthetizing the animal, if the latter is found necessary.

I have used bichloride of mercury 1 to 5,000, and Kreucamph in a weak solution, and like the latter better. One must be cautious in the use of fluids if the animal is cast, in order not to damage contents of abdominal cavity. If the wound is not of too long standing, the least interference possible, as far as abdominal contents are concerned, the better. Where wounds are too high for drainage of abdominal cavity I prefer sterile gauze and change it daily by use of dressing forceps through opening left for drainage. Frequently one is forced to make a dependent opening for drainage, and I would rather do this than make the skin wound larger if the wound in the peritoneum does not correspond with the wound in the muscles and skin. Sterile camphorated oil is of great aid in overcoming shock, and if possible I like to administer 10 mils at a dose once or twice daily for the first two or three days. Food and water must be limited and the diet laxative in character, and if necessary give oil to keep the bowels loose.

A sheet or muslin bandage must be employed if the wound is at all large, to relieve the strain on the sutures. The animal should be retained in a standing position. In cases of edema, slow exercise is beneficial. The animal should not be used for heavy work for 6 to 8 weeks, as danger of hernia is too great. When casting the animal in preparation for the operation, all four feet should be fixed by means of the harness and drawn up at the same time, when the animal will fall without any great amount of struggling.

The Governor of South Carolina has appointed the following veterinarians to serve on the newly created Board of Veterinary Examiners: President, Benj. McInnes, Charleston; Vice-President, M. L. Blackstock, Spartanburg; Secretary and Treasurer, W. A. Barnette, Greenwood.

ABSTRACTS

ON THE OCCURRENCE OF THE ERYSIPELAS (ROTlauf, BZW. MURISEPTICUS-BAZILLEN) IN NATURE AND A RESULTANT SOURCE OF ERROR IN ERYSIPELAS DIAGNOSIS. W. Pfeiler. Arch. Hyg., vol. 88 (1919), p. 199.

Avirulent, vegetative forms of the erysipelas bacillus are far more widespread in nature than is generally supposed. They are particularly abundant in decomposing substrates, and easily become virulent to mice. In organs from animals handled under sterile conditions the recovery of the erysipelas bacillus was much rarer than in organs from animals exposed to infection through shipment to the laboratory. It is therefore extremely dangerous to make a diagnosis of erysipelas in any decomposing material because the bacillus has been isolated. Three days after slaughtering sound hogs, the erysipelas (or murisepticus) bacillus was isolated from the organs. The bacillus has been isolated from organs of animals not susceptible to the disease.

W. N. BERG.

ULCEROUS LESIONS OF THE TONGUE AND LARYNX IN A HORSE REACTING TO MALLEIN AFTER CONTACT WITH GLANDERS-INFECTED ANIMALS. M. Liegois. Ann. Méd. Vét., vol. 64 (1919), p. 241.

The horse in question, reported as having cohabited with glandered animals, was given the intradermo-palpebral mallein test March 5, 1919. Reaction negative. March 17 there was violent angina with its usual attendant symptoms and bilateral muco-purulent discharge. At the same time there appeared an ulcer on the internal face of the left thigh with diffuse lymphangitis of the corresponding member. Animal was killed on the 20th.

Although autopsy showed numerous lesions in the larynx, tongue, etc., the pathological examination showed nothing decisive. Nothing happened to a guinea pig injected with some macerated glandular material. In view of these negative findings one might have suspected the lime used in whitening the stables. But this can be excluded because several horses were exposed to the same conditions and only one presented lesions. Rubbing the buccal mucosa of several subjects with fragments of lime did not reproduce the lesions.

In spite of a negative reaction to mallein (made at the time when the disease was probably in the incubative stage), in spite of

the absence of orchitis in a guinea pig inoculated with the macerated lymphatic tissue, it is probable that this was a case of glanders infection.

W. N. BERG.

ACTINOMYCOTIC PLEURISY IN A DOG. Th. Kitt. Monatsh. Prakt. Tierheilk., May, 1919, p. 518.

In this case the following history is given: A dog 1½ years old had been operated on for a hematoma of the chest wall; 14 days later a diagnosis of pneumonia was made and the animal treated for this condition. As there was no improvement, the dog was sent to clinic for treatment. An examination revealed a lentil-sized ulcer at the seat of the operation. With each inspiration there was visible a slight raising of the fine membrane lying over the bottom of the ulcer. Temperature 103.3, pulse 56, respiration 60. Severe inspiratory and expiratory dyspnea. In the lower half of the right lobe of the lung there is bronchial breathing and light rasping sounds; occasionally coughing without expectoration. Great cardiac weakness, severe subacute parenchymatous nephritis, bacteruria (colon type bacilli). During the first 8 days of treatment a decided improvement set in, but the fistulous opening would not heal. After 14 days' further treatment the condition of the animal became much worse and marked symptoms of pleurisy appeared. The dog became emaciated; temperature rose to 104.4, pulse 180, respiration 72. The dog died 26 days after entering the clinic.

At autopsy there was found a fistulous tract in the intercostal muscle between the last two ribs which ended blindly against the pleural wall. Its inner surface showed a dark gray-red granulation tissue covered with only a slight amount of wound secretion. In the chest cavity there was about ½ liter of sero-purulent fluid (cloudy and yellowish red) in which were seen countless whitish to yellowish white sand-like grains. Everywhere the parietal and visceral pleura as well as the pericardium and mediastinum were covered with thick, sticky pus and showed soft, flabby, felt-like tufts of granulation tissue, pale bluish red to dirty dark gray-red in color. Both lungs showed marked compression atelectasis. The abdominal organs were grossly normal with the exception of a parenchymatous degeneration of the kidneys and a passive congestion of the liver.

Upon microscopic examination a diagnosis of actinomycosis was made.

L. T. GILTNER.

DOCHMIASIS IN HUNGARIAN CATTLE (HOOKWORM). Csontos and Patski. Deut. Tierärztl. Wehnschr., 1918, p. 277. (Abstract in Monatsh Prakt. Tierheilk., May, 1919, p. 567.)

Dochmiasis or ankylostomiasis (bunostomiasis) of cattle is caused by *Strongylus radiatus*, which more recently has been given the name *Bunostomum radiatum*. The disease occurred in the fall of 1917 in cattle in Hungary, and caused severe losses. The symptoms consisted of diarrhea, emaciation, weakened condition, anemia (3 million erythrocytes), as well as bloody feces. A sure diagnosis is possible only through microscopic demonstration of the parasite eggs in the feces. At autopsy there were found many male (15 to 18 mm. long) and female (25 to 28 mm. long) worms in the small intestine. As many as 4,000 worms were found in a case. Treatment with distol, a male fern preparation, in 3 to 4 single doses of 4.5 gms., was successful.

L. T. GILTNER.

REVIEW

DISEASES OF DOMESTICATED BIRDS. By Archibald Robinson Ward, Director, Research Department, Jensen-Salsbery Laboratories, Kansas City, Mo., and Bernard A. Gallagher, Bacteriologist, Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C., with introduction by Veranus Alva Moore, Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College at Cornell University, and Director of the College. The Macmillan Company, New York, 1920, pp. 333. Price \$4.

Ward and Gallagher have written a book. "Diseases of Domesticated Birds" is a valuable addition to our literature and an inestimable contribution to a previously neglected but very important branch of our science, as Dr. Moore observes in his comprehensive introduction.

There are 25 chapters comprising 333 pages and approximately 70 clear-cut, distinct and effective illustrations. The first two chapters give a snappy review of the anatomy, physiology, hygiene and sanitation of birds. The contagious and infectious diseases, parasitic infestations, general diseases, morbid anatomy, toxicology and surgical diseases are handled in thorough systematic, masterly fashion. Consistent with the needs of the topic, concise, instructive titles, adequate synonyms, characteristics, etiology, history, epizootology, symptoms, pathogenicity, lesions, treatment and

prophylaxis are treated with minute detail, from both the scientific and practical viewpoints, and with wide comprehension. Caponizing and killing poultry constitute two well-illustrated, practical and instructive chapters. The chapter on toxicology deals with the lethal, toxic and nontoxic doses of various poisonous substances, supplemented with experiments which are illuminating and convincing. An unusually complete list of references follows each chapter, which progressively reinforce one's confidence in the work as he reads.

The wide range of experience of Ward and Gallagher in university, experiment station, Bureau of Animal Industry, and industrial biological work, along teaching, disease-controlling and research lines, particularly qualifies them for the accomplishment of this excellent literary effort. "Diseases of Domesticated Birds" should be in the hands of every veterinary physician, teacher, experimenter, pathologist, bacteriologist, serologist, parasitologist, poultryman, farmer and zoological garden director and pathologist.

This work must be an encouragement to the poultryman and insure an advance of the poultry industry, stimulate the pathologist to greater investigational efforts, and widen the practical field of the veterinary physician.

The Macmillan Company as usual has maintained its high standard of efficiency in accuracy, quality, and bright, clear print which make study a pleasure.

W. J. C.

Dr. S. B. Nelson, who was State Veterinarian of Washington for 18 years and for 25 years head of the College of Veterinary Science of the Washington State College at Pullman, is now head of the U. S. Extension Department at the same institution. Dr. E. E. Negner has been promoted to vice dean of the Veterinary College to succeed Dr. Nelson.

A. R. Galbraith of Garfield, Washington, and Dr. C. W. Gay, head of the Department of Animal Husbandry at the University of Minnesota, were two of the judges at the recent Horse Show held at Edmonton, Alberta, Canada.

Capt. Clarence Loveberry, who has been stationed in Manchuria, is now on leave at Somerset, Ohio, but will be ordered to Walter Reed Hospital, Washington, D. C., for surgical treatment, after the expiration of his leave.

ARMY VETERINARY SERVICE

NEWS FROM THE SURGEON GENERAL'S OFFICE

THE veterinary laboratory maintained at 39th and Woodland avenue, Philadelphia, Pa., in rooms made available through the generosity of the authorities of the University of Pennsylvania, has been transferred to the Army Medical School, Washington, D. C. The personnel now on duty at this laboratory includes Captain Raymond A. Kelser, Captain Curtice C. Bourland, First Lieutenant Walter K. Herbott, First Lieutenant John H. Kinter, and three enlisted men.

The following orders of transfer and reassignment have been issued for veterinary officers:

Lieutenant Colonel Gerald E. Griffin, U. S. A., from Fort Myer, Va., to the Eastern Department, Governors Island, N. Y., as Department Veterinarian, Assistant to the Department Surgeon.

Major William C. Van Allstyne, U. S. A., from Fort Oglethorpe, Ga., to Camp Dodge, Iowa, as Camp Veterinarian and Division Veterinarian.

Major William J. Ratigan, U. S. A., from Camp Know, Ky., to Remount Depot, Camp Funston, Kan., as the Veterinarian.

Captain Robert H. Glenn, V. C., from the Fifth Division, Camp Gordon, Ga., to Fort Oglethorpe, Ga., as the Post Veterinarian.

Captain Floyd C. Sager, V. C., from instruction in meat inspection, Chicago, Ill., to Camp Devens, Mass., as Camp Veterinarian.

Captain Paul O. Cooper, V. C., from Camp Devens, Ayer, Mass., to Chicago, Ill., for instruction in meat inspection.

Captain John R. Stifler, V. C., from Kansas City, Mo., to Remount Depot, Camp Kearney, Calif., as the Veterinarian.

Captain Thomas S. Hickman, V. C., from Remount Depot, Camp Kearney, Calif., to Sacramento, Calif., as Purchasing Zone Veterinarian, Western Purchasing Zone.

Captain Elmo P. Coburn, V. C., from Kansas City, Mo., to Sacramento, Calif., Western Purchasing Zone.

Captain Charles S. Dunphy, V. C., from Chicago, Ill., to Atlanta, Ga., as Zone Veterinarian, Zone 5.

First Lieutenant Ernest F. Erfurth, V. C., on detached service at Kansas City, Mo., to Camp Holabird, Md., as Camp Veterinarian.

First Lieutenant Charles B. Skinner, V. C., from Camp Jackson, S. C., to Raritan Arsenal, N. J., for duty.

First Lieutenant James W. Graham, V. C., from Remount Depot, Camp Meade, Md., to Remount Depot, Camp Lee, Va.

First Lieutenant John E. Miller, V. C., from Camp Devens, Mass., to 7th Division, Camp Funston, Kansas.

First Lieutenant Orville E. Markley, V. C., from Remount Depot, Camp Gordon, Ga., to Remount Depot, Fort Bliss, Texas.

First Lieutenant Fred C. Waters, V. C., from Remount Depot, Camp Travis, Texas, to Chicago, Ill., for instruction in meat inspection.

Second Lieutenant Samuel W. Clark, V. C., to Zone No. 10, San Antonio, Texas, as Assistant to the Zone Veterinarian.

Drs. Townsend, Neil, Fleming and Busman, inspectors-in-charge of the Federal meat-inspection service at New York, Chicago, Kansas City and Omaha, respectively, were recent visitors to headquarters where a three-day conference was held in connection with Bureau policies and activities.

The New York State Legislature has appropriated \$15,000 to the New York State Veterinary College at New York City, of which Dr. W. Horace Hoskins is Dean. During the evening of the same day a drive was started to raise a \$300,000 endowment fund for this veterinary college.

Dr. Robert L. Humphrey, in the veterinary service of the Southern Railroad, and Miss Ethel Virginia Boss, of Washington, D. C., were recently married at the home of the bride. The JOURNAL extends congratulations and wishes them a happy and prosperous future.

Dr. L. C. Pottle, of Quincy, Ill., recently placed his order for one million cubic centimeters of hog cholera serum with one of our advertisers. This is one of the largest single contracts that has come to our attention.

A joint meeting of veterinarians of Washington and Oregon will be held in Portland, Oregon, during the month of June.

Dr. A. R. Ward, formerly Director of Research of the Jensen-Salsbery Laboratories, has accepted a similar position with the National Single-Bled Serum Company at Plainfield, Ind.

ASSOCIATION NEWS

"DO IT NOW"

THE American Veterinary Medical Association meets in Columbus, Ohio, August 23-27, 1920, inclusive. We print herewith a list of approved hotels and somewhat complete information regarding each. The Committee on Local Arrangements very much desires that all who contemplate attendance make hotel arrangements *now*. It is easier and more pleasant in these troublesome days of shortage of housing conditions to cancel a reservation, as late as August 15, than it may be to engage a room or rooms later on. Adopt the A. M. V. A. slogan of "Two thousand members and one thousand non-members at the Columbus meeting. Bring the ladies."

For the convenience of those in Ohio, Michigan, Indiana, etc., who plan to motor to Columbus, information is now being compiled on storage garages. This will be printed herein in a subsequent issue.

Hotel Accommodations in Columbus, Ohio

April 17, 1920

Name	No. rooms	No. beds	No. can accom.	Min. Single	Max. Single	Min. Double	Max. Double
Deshler (A. V. M. A. Hqrs.)	360	450	700	\$2.50	\$6.00	\$4.50	\$8.00
Chittenden	252	275	500	2.00	4.00	4.00	6.00
Neil	150	235	260	2.00	5.00	5.00	6.00
Seneca	200	240	225	3.00	5.00	4.00	8.00
Southern	250	390	425	1.50	2.00	2.50	5.00
Hartman	110	150	200	2.00	3.00	6.00	10.00
Virginia	125	145	160	1.25	3.00	2.00	6.00
Columbus	190	200	450	1.25	2.00	2.50	3.50
Star	150	300	400	1.00	3.00	2.00	5.00
Norwich	100	162	209	1.50	3.00	3.00	5.00
Waldo	30	30	60	1.25	1.25	2.00	2.00
Arcade	27	32	60	.50	1.50	1.50	4.00
Lazelle	35	40	60	1.25	1.50	1.50	2.50
Rector	17	19	34	1.25	...	...	4.00
Davidson	73	80	200 (weekly)	3.50	6.00	7.00	10.00
Jefferson	86	112	225	1.50	2.50	3.00	6.00
Winton	60	65	125	1.50	1.50	2.50	3.50
Hartman Annex	73	82	82	.50	2.00	1.50	3.00
Metropole	34	34	65	1.00	...	...	1.50
Dennison	121	90	120 (m'thly)	10.00	25.00	25.00	40.00
Lenox	100	70	100	1.50	...	...	2.00
State	60	70	100	1.00	1.50	3.00	4.00
Farmers	75	75	75	.75	1.00	1.00	2.00
Bryden	39	39	70	.50	1.50	1.00	2.00

The Committee on Local Arrangements is best informed on the first ten above named. They are the larger hotels and the committee recommends them to the profession in the order named. Likewise the Columbus Conventions and Publicity Bureau, which furnished the above information, states that they have investigated each hotel therein listed and can recommend each as a safe and respectable place to register. Other hotels in Columbus which have not met the approval of the Bureau, upon their investigation, have been omitted. The Hotel Seneca is a new apartment hotel, first class in every respect, where we believe the older members and their wives would be most comfortably housed. The Seneca is just one square from Memorial Hall, the place of the sessions, its proximity being worthy of consideration the hot third week of August.

The Committee on Local Arrangements suggests that those who contemplate attendance at the meeting make reservations at once, addressing the hotel direct and in each instance request a confirmation of the reservation, stating room number, price, etc. Thus much confusion will be avoided upon arrival. If upon arrival you are "armed" with a letter from a hotel stating that room No. XXX has been assigned you at \$XXX per day for August 22-26, inclusive, you will surely get *that* room. If, however, you can state only that you wrote requesting same, you *may* get the room—and you may not. So, fellow veterinarians, let's play "safe" by following the above suggestions. We want *you* taken care of and pleased. If you feel that you prefer to request the Local Committee to make your reservation along the lines of your desires, just mail them in and we shall be happy to serve you, asking the hotel in which we reserve a room to confirm same by personal letter to you. Inquiries or communications may be addressed to Dr. F. A. Lambert, chairman (1996 Summit St.), or Dr. O. V. Brumley, president, Ohio State Veterinary Medical Association (Ohio State University).

NOTE FROM THE SECRETARY

PRESIDENT CARY has planned that the next meeting of the A. V. M. A., to be held in Columbus on August 23d to 27th, shall be essentially a practitioners' meeting. Columbus is centrally located, so that the large number of practitioners can conveniently attend. The chairmen of the sections on Practice and Sanitary Science are working on the program. Both of them promise unusually good papers for their respective sections.

There are a number of papers that will probably come under the

heading of General Session, that is, papers that do not pertain either to Practice or Sanitary Science and Police. All members of the Association who have something to present should notify the Secretary as soon as possible, as we intend to have a program completed by the first of July. If you have something on your mind that would do the Association good, let us hear about it, or if you know of some one else who can present an interesting and helpful paper, let us know about it. N. S. MAYO.

OTHER ASSOCIATIONS

SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

The fourth annual meeting of the Southeastern States Veterinary Medical Association was held at Piedmont Hotel, Atlanta, Ga., February 19 and 20. Convening at such a critical time, when there is so much unrest in the profession at large, the discussions were of timely and unique interest. Dr. J. S. Andrade presided at the meeting.

The session was opened by the President's address. He pointed out the veterinarian's duty to society in prevention of diseases of live-stock; in the reduction of rate of deaths of sick animals; in proper treatment of their clients by giving information and advice about feeding, breeding and caring for their animals. Among the most important problems to which he invited the convention's attention were milk sickness, its causes and effects; parasitology as a field for the investigator; the establishment of accredited herds; the progress of tick eradication, etc.

Following the president's address, the afternoon session was devoted to the paper of Dr. G. W. Browning on "Auto-toxemia as a Cause of Disease," and Dr. John I. Handley's paper on "Southern Canine Plague." The discussions were led by Drs. Cary, Bahnsen and Bell, and there was much interest shown in these subjects.

The evening session was devoted to papers by Dr. Caughman on "Treatment of Mange in the Dog," while "Municipal Abattoir" was discussed by Dr. Andrade. The remainder of the evening was then given to the subject of "Interstate Shipping." Several state veterinarians being present, much benefit resulted, as this topic was discussed freely by the practitioners present.

The leading paper of the following morning was "Clinical Differentiation of Swine Diseases," by Dr. A. L. Hirleman. Several B.

A. I. veterinarians were present to give interesting and instructive discussions on this paper. A paper by Dr. E. D. King was read, entitled "Shipping Fever in Horses and Mules."

Dr. Cary, president of the A. V. M. A., honored the association with his presence and reported the progress for the coming meeting of that association. He anticipates the largest attendance ever had. He spoke with highest approval of the manner in which the Ohio State Veterinary Medical Association formulated their plans for making the next meeting the biggest and best ever held, and announced their slogan as "2,000 veterinarians present."

The committee on resolutions reported as follows:

WHEREAS, The Army Medical Service Bill, now pending before Congress, embraces the Veterinary Corps, therefore, be it resolved—

That the Southeastern States Veterinary Medical Association, in convention at Atlanta, Ga., February 20, 1920, do, hereby, request and petition Congress to give to Veterinary Officers in the Army Corps the ranks from First Lieutenant up to and including Colonel; and further be it resolved that Congress comply with all suggestions offered by the Surgeon General for the Army Veterinary Corps; and further be it resolved that a copy of these resolutions be spread on the minutes of the Association and that a copy be sent to each southern Congressman and a copy to the Surgeon General.

WHEREAS infectious diseases of animals are spread by infected cars, barns and stables, therefore be it resolved—

That the Southeastern States Veterinary Medical Association recommend that every State and the Department of Agriculture of the United States require the cleaning and the disinfection of all cars, stables and barns after shipment of live-stock, and that all public stock yards, barns and pens be cleaned and disinfected as often as the inspectors in charge deem it necessary.

WHEREAS the Association has suffered the loss of the following members since the last meeting: Dr. W. G. Shaw, Knoxville, Tenn.; Dr. W. W. Parrish, Fitzgerald, Ga.; Dr. Thomas B. Carroll, Wilmington, N. C.; Dr. J. F. Foley, Kinston, N. C.; Dr. Watt Ashcraft, Monroe, N. C.; Be it resolved—

That it is the sense of this meeting that the secretary be instructed to write a letter of respect and condolence to the members of the bereaved families, extending to them the sympathy of the members of this association, and that a copy of this resolution be spread on the minutes of the Association.

Be it resolved that the Georgia veterinarians be extended a vote of thanks for their invitation and their loyal hospitality to the Southeastern States Veterinary Medical Association during their stay in Atlanta.

The resolutions as read by the committee (Dr. D. A. Piatt chair-

man, Dr. W. D. Staples, and Dr. M. R. Blackstock) were unanimously adopted.

The afternoon was devoted to a business session. The Secretary, Dr. W. W. Webb, showed the progress that the Association had made and it was very gratifying to see the enthusiasm regarding the future. Twenty new members were received.

The next meeting will be held at Spartanburg, S. C., during the month of January, 1921, the exact date to be decided on later.

The following officers were elected for the ensuing year:

President, Dr. F. P. Caughman, Columbia, S. C.; First Vice President, Dr. M. R. Blackstock, Spartanburg, S. C.; Second Vice President, Dr. William M. Bell, Nashville, Tenn.; Third Vice President, Dr. D. A. Piatt, Birmingham, Ala.; Secretary-Treasurer, Dr. John I. Handley, Atlanta, Ga.

In closing the meeting, the newly installed president requested all members to give him all the assistance possible to make the next meeting the best that the association has ever had. Several members expressed enthusiastically their interest and suggested plans to have every member present at the next meeting at Spartanburg, S. C.

JOHN I. HANDLEY, *Secretary-Treasurer*.

MAINE VETERINARY MEDICAL ASSOCIATION

THE quarterly meeting of our Association was held at the Elmwood Hotel, Waterville, Me., April 14, 1920.

Meeting called to order by Dr. W. H. Lynch, president. Records of the last meeting were read and approved. Members present at roll call: Drs. L. S. Cleaves, W. H. Corey, J. B. Darling, C. F. Davis, C. F. Dwinal, A. Joly, W. H. Lynch, M. R. Maddocks, C. W. Purcell, F. L. Russel, E. E. Russel, C. I. Ryan, I. L. Salley, H. L. Stevens, W. L. West, A. J. Neal, and P. R. Baird. Visitors present were Dr. E. H. Cook, St. Stephens, N. B.; Dr. E. A. Crossman, Boston, Mass.; Dr. A. N. Brown, Pittsfield, and Mr. Boughner of the Abbott Alkaloidal Company.

The applications of Drs. E. H. Cook, L. E. Maddocks, E. B. Beals and D. K. Eastman were received and referred to the executive committee, who approved the same and they were elected to membership.

Voted to have one hundred new copies of the constitution and by-laws printed. Upon motion of Dr. Maddocks, seconded by Dr. A. J. Neal, there were voted to honorary membership all who had been

members twenty-five years or over. It was suggested by Dr. W. H. Lynch that the association endorse a member for appointment to the Board of Veterinary Examiners. It was voted to endorse Dr. P. R. Baird for appointment, and to endorse Dr. A. J. Neal for any further vacancy on the Board. Moved by Dr. W. L. West, seconded by Dr. C. F. Davis, that the President of the M. V. M. A. present a name to the President of the A. V. M. A. as endorsed by this association for Resident Secretary of the A. V. M. A. in Maine.

An interesting paper, "Some Hints to the Veterinarian on Canine Practice," by Dr. C. R. Inglis, was read by the Secretary. This provoked considerable discussion on various methods of handling vicious dogs.

Dr. H. L. Stevens presented a paper on "Azoturia." It was discussed by Drs. Salley, Cook, West, Joly, Crossman, Maddocks and Davis.

Dr. E. H. Cook, President of the New Brunswick Association, was called on and gave a short interesting response. He thanked the M. V. M. A. for electing him to membership, and said he was glad of the opportunity to gather so many ideas and methods of doing business to take back to his Association, which is one of the youngest in America.

On motion of Dr. P. R. Baird, seconded by Dr. A. Joly, Dr. E. A. Crossman, B. A. I., Boston, Mass., was elected to honorary membership.

Moved by Dr. Baird, seconded by Dr. Joly, that the next quarterly meeting be held in Portland, July 14, that invitations be extended to the veterinary associations of Massachusetts, Vermont, New Hampshire, and New Brunswick; also the New England Association of Sanitary Commissioners. P. R. BAIRD, *Secretary*.

MONTANA VETERINARY MEDICAL ASSOCIATION

THE twelfth semi-annual meeting of the Montana Veterinary Medical Association will convene in Butte, Montana, on July 29-30, 1920.

The executive committee has chosen the place and dates mentioned particularly on account of the splendid facilities afforded for the demonstration of a clinic and pathological exhibit on tuberculosis.

Dr. W. J. Butler, State Veterinarian of Montana, and Dr. Rudolph Snyder, veterinarian in charge for the B. A. I. in Montana, will coöperate in arranging a program, clinic and pathological exhibit on tuberculosis, which will probably occupy the entire day of July 30.

Mr. Walter Hansen, manager of the Hansen Packing Company, of Butte, has generously offered the use of the packing plant, or such part of it as may be necessary for the use of the Association, and will use the resources at his command to supply whatever material the Association may need. Mrs. Hansen has sent, through Dr. N. T. Gunn, of Butte, an urgent invitation to the ladies who may accompany the veterinarians, to be her guests at certain functions to be announced. Those of us who attended the Association meeting in Butte last year can testify how well the Hansens can entertain and yet we are assured of a much more elaborate preparation for the coming convention.

There will probably be at least one address by a prominent veterinarian from another State, and it is the hope of President Remer and myself that the first day's program may be filled with discussions of subjects which are of vital interest to the profession. You are requested to send in your subjects at as early a date as possible and not later than June 20, in order that the programs may be in your hands in time to complete your preparations for the meeting. I hope to have a demonstration of the practical control of contagious abortion in cattle by a veterinarian who has demonstrated the success of his methods on a number of the most valuable herds in the world.

Your attention is called to a contemplated change in the constitution and by-laws and this notice is given by authority of the executive committee:

Section 1 of Article IX reads: "The annual meeting of the Association shall be held during the month of October of each year." The amendment to be voted on is to read: "The time of the annual meeting of the Association shall be determined by the executive committee unless otherwise determined by the Association in convention assembled."

I am certain that no veterinarian in Montana can afford to miss this convention.

A. D. KNOWLES, *Secretary-Treasurer.*

MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION

THE summer meeting of the Minnesota State Veterinary Medical Association will be held at Austin, Minn., Thursday and Friday, July 22d and 23d. We are preparing an interesting and instructive program, and among other things are going to feature diseases of sheep. We anticipate a large attendance and an interesting meeting.

C. P. FITCH, *Secretary.*

PHILIPPINE VETERINARY MEDICAL ASSOCIATION

YOU might be interested to know that in these far-away islands called "The Philippines," the veterinary medical profession is branching out. We are just starting, hence our modest proportions. We have here a College of Veterinary Science with 61 students. It was founded in 1910, and within the last ten years we have enrolled 420 and graduated 26. Our graduates here have been admitted into the American Veterinary Medical Association, and recently the Bureau of Animal Industry recognized our prescribed curriculum.

The eighth annual meeting, held January 30 and 31, was highly successful. Following are the newly elected officers: President, Dr. David C. Kretzer; Vice-President, Dr. Vicente Ferriols (re-elected); Secretary, Dr. Angel K. Gomez (re-elected); Treasurer, Dr. Stanton Youngberg.

A. K. GOMEZ, *Secretary*.

SOUTH CAROLINA ASSOCIATION OF VETERINARIANS

THE regular quarterly meeting of the South Carolina Association of Veterinarians was held at the Jefferson Hotel in Columbia, April 22, President F. E. Kitchens presiding, with 30 veterinarians present. At 8 o'clock the members gathered in the private dining-room and enjoyed a good banquet. At the conclusion of the banquet we were treated to some live, short talks by several of the most prominent live-stock men of the State and the Assistant General Agent of the Southern Railway System, who were present as guests of the Association. Following these speeches, papers were presented for discussion by Drs. T. B. Jacobs on "Prolapsed Uterus" and J. W. Buchanan on "The Veterinarian as Health and Sanitary Officer."

In the afternoon prior to the meeting the Veterinary Board of Examiners held a special meeting and passed on important matters. This board, which consists of Drs. Benj. McInnes, M. R. Blackstock and W. A. Barnett, was elected at a special meeting of this Association March 30.

Since the passage of a law by the last General Assembly to regulate the practice of veterinary medicine in this State, the interest in the Association has been revived, the membership has practically doubled, and every veterinarian in the State is an enthusiastic supporter.

The next quarterly meeting will be held July 13 at Union, as guests of the Sardis Farms, Inc., which has one of the largest Duroc-Jersey herds in the South. At this meeting the papers will be confined entirely to the discussion of the diseases of swine.

F. P. CAUCHMAN, *Secretary-Treasurer*.

ILLMO VETERINARY MEDICAL ASSOCIATION

THE Illmo Veterinary Medical Association held its fourteenth semi-annual meeting in St. Louis April 30. For a one-day meeting it was one of the best this thriving association has held.

The clinic was held at Dr. J. T. Jenneman's hospital and consisted of numerous subjects for diagnosis and medical and surgical treatment.

At 1 p. m. we were escorted by Dr. Darling, of St. Louis, chairman of the local committee, to the home of the Missouri Athletic Association, the most elaborate clubhouse, in St. Louis, where dinner was served. The program was continued in the dining-room, with Dr. A. T. Peters, State Veterinarian of Illinois, and Dr. H. Jensen, of Kansas City, acting as the clearing-house for most of the queries. Dr. W. Hoehner, of Belleville, who was in charge of the question box, also took an active part. In the absence of the president, Dr. Finnegan, of Chester, Drs. Jennings and Michael acting in that capacity.

We had the largest attendance in our history, and each one felt that the time and money required to attend the meeting were well expended. The next meeting will be held at Collinsville, Ill., some time in October.

L. B. MICHAEL, *Secretary*.

ALFALFA CLUB

THE Alfalfa Club held its fourth annual banquet at the Bellevue-Stratford Hotel, Philadelphia, Pa., May 6, and had a large attendance. Among the prominent speakers of the evening were Col. C. F. Morse, M. C., U. S. A., Director of the Veterinary Corps, U. S. Army, and Dr. M. Jacob, State Veterinarian of Tennessee.

The following officers were elected for the coming year: President, Dr. John H. McNeil, State Veterinarian of New Jersey; Secretary-Treasurer, Dr. E. H. Yunker, Philadelphia; Board of Directors, Drs. B. F. Senseman, E. Hogg, E. L. Cornman and F. H. Schneider.

The following day Drs. McNeil, Jacob and Munce made up an automobile trip and visited the Pennhurst Farm, where there are about 150 purebred Ayreshire cattle under the supervision of Dr. E. S. Deubler.

The Keystone Veterinary Medical Association has been replaced by the Philadelphia Veterinary Club. Dr. C. S. Rockwell, 5128 Chestnut Street, is Secretary. Meetings are held on the fourth Tuesday of each month.

Dr. R. M. Staley, 109 Ardmore Avenue, Ardmore, Pa., has been elected Corresponding Secretary of the Pennsylvania State Veterinary Medical Association.

C. S. ROCKWELL.

NECROLOGY

IT is with sincere regret that we announce the sudden death of Dr. Samuel E. Cosford on April 13, 1920.

Dr. Cosford was born at Hollen, Ontario, Canada, January 11, 1868. His early education was obtained in the common schools of Ontario, where he entered the Mt. Forrest high school at the age of sixteen, and in March, 1887, he was graduated from the Ontario Veterinary College with the degree V. S. He took up the practice of his profession at Lincoln, Nebraska; and in 1892 he became a naturalized citizen of the United States.

On December 10, 1895, Dr. Cosford was appointed assistant inspector in the Bureau of Animal Industry at South Omaha, Nebraska, and he remained continuously in its service from the date of his appointment. During the twenty-five years that Dr. Cosford was with the Bureau of Animal Industry he was engaged principally in animal disease control work in the West. He acquired an intimate knowledge of the live-stock industry and was very successful in combating under range conditions such contagious diseases as sheep and cattle scabies, dourine and anthrax. At the time of his death he had charge of the consolidated Bureau forces in Nebraska engaged, in co-operation with the State authorities, in the control and eradication of tuberculosis, hog cholera, sheep and cattle scabies and dourine. His scientific attainments and efficiency, his high sense of duty and his moral courage to carry into effect his convictions and instructions under difficulties made his services highly valuable to the Bureau and to the live-stock industry of the large territory under his supervision.

Dr. Cosford was deeply interested in the advancement of the veterinary profession in this country. He was a member of the prominent societies and organizations intended to advance veterinary education, among which might be mentioned the American Veterinary Medical Association, United States Live-stock Sanitary Association, Nebraska Veterinary Medical Association, Missouri Valley Veterinary Association, and National Association of B. A. I. Veterinarians. He had a wide acquaintance among the live-stock men of the West, who reposed implicit confidence in his ability and good judgment in live-stock matters. The Bureau and the veterinary profession have lost a valuable member and the news of his death will be

received sadly in many ranch homes on the Great Plains as well as by members of the Bureau who have had the privilege of knowing him.

DR. JOSEPH HUGHES, President of the Chicago Veterinary College, passed away April 24, the immediate cause of his death being cardioplegia.

Dr. Hughes was born at Newton, Knockbridge, Dundalk, Ireland, May 30, 1859, and was therefore nearly 61 years of age at the time of his death. He graduated from the Royal College of Veterinary Surgeons, Glasgow, Scotland, in 1880, and after two years as assistant city veterinarian of Dublin he came to the United States in 1882. He was one of the founders of the Chicago Veterinary College in 1883 and was connected with the college continuously.

His experience with pleuro-pneumonia in Dublin enabled him to recognize the disease when it appeared in Illinois in 1886, and he gave valuable assistance in stamping it out. For a number of years he was Assistant State Veterinarian of Illinois. He joined the American Veterinary Medical Association in 1890 and always took an active part in the affairs of the Association, being one of the regular attendants at its meetings. He had been a member of the Executive Committee and in 1916 was appointed a member of the Executive Board. He was a frequent contributor to the programs of the A. V. M. A. and other veterinary associations, and served as President of the Illinois State Veterinary Association and of the Chicago Veterinary Society.

Dr. Hughes was a member of the commission appointed by President Roosevelt to investigate and classify the veterinary colleges of the United States, and was president of the organization of the Associated Veterinary Faculties of Colleges of North America. For several years and up to the time of his death he was official veterinarian to the National Dairy Show Exhibitors' Association, and during the outbreak of foot-and-mouth disease in 1914 he did valuable work in saving the fine cattle at the National Dairy Show.

Dr. Hughes was one of the best known veterinarians in America, and during the years of his great usefulness he reared to himself an enduring monument as a leader, a teacher and a gentleman. He was an unusually interesting lecturer on veterinary subjects and a man of pleasing personality. He will be remembered by many veterinarians because of his generosity and his willingness to assist those who were in need. By his wisdom, energy and amiable disposition he made indelible impressions upon the lives of many

young men of the Nation who will always revere his memory and strive to emulate his worthy example. He continued his college work up to a few days before his death.

DR. GEORGE McEVERS, a prominent practitioner of Chicago, died on the same day as Dr. Hughes, April 24. Dr. McEvers was a graduate of the Ontario Veterinary College in 1877 and had been a practicing veterinarian in Chicago for thirty-six years. At one time he was associated in practice with Dr. McKillip. Dr. McEvers enlisted in the Army Veterinary Corps and went overseas with the 122d Field Artillery, attaining the grade of first lieutenant.

DR. JOHN FROST WINCHESTER, who was known nationally as an authority on veterinary medicine, died April 27th, at his home in Lawrence, Mass., after a several days' illness of pneumonia. Dr. Winchester was Lawrence's oldest veterinary surgeon and had been cattle inspector since 1890.

Dr. Winchester was born in Lynn August 5, 1855, and lived there until he was ten years old, when his family removed to Peabody. He was graduated from the local high school and from Massachusetts Agricultural College at Amherst in 1875. He took a graduate course at Amherst in chemistry and veterinary surgery and was graduated from the American Veterinary College in New York City in 1878.

Three months after finishing his studies Dr. Winchester started to practice in Lawrence, Mass., in which he was actively engaged until within a few days of his death. He lectured to classes at Massachusetts Agricultural College and at New Hampshire State College. He was keenly interested in preventive veterinary medicine and was the author of several books and many articles relative to the profession. For two years he was State inspector of cattle. He was prominent at conventions of veterinarians in the United States and Canada.

Dr. Winchester was a past president and vice president of the American Veterinary Medical Association and was resident State secretary at the time of his death. He was president of the Massachusetts Veterinary Association for two years and for four years was a member of the Massachusetts Cattle Commission. He was an honorary member of the Maryland Veterinary Association and recent honors were election to the committee on meat inspection of the American Public Health Association and to the Authors' Club of London.

Dr. Winchester was a member of Phoenician Lodge, A. F. and A. M., Mount Sinai, R. A. C., Lawrence Council, R. and S. M., Bethany Commandery, Knights Templar, the Scottish Rite bodies of Lowell and Consistory and Aleppo Temple of Boston, the Home Club and Lawrence Lodge, No. 65, B. P. O. E.

Mrs. Sesco Stewart, widow of the late Dr. Stewart, formerly Dean of the Kansas City Veterinary College, passed away April 29 as the result of an attack of uremic poisoning. Mrs. Stewart will be remembered by many members of the A. V. M. A. as she was a frequent attendant at the annual meetings.

MISCELLANEOUS

A SURPRISE

ON April 13 the birthday anniversary of Dean Moore, of the New York State Veterinary College, was observed at his home by the members of the college faculty. While the Dean was attending a board meeting, the faculty members, their wives and a few others assembled. On his return Dr. Moore was surprised to find his home filled with friends. The following delightful program was presented:

1. Piano Solo *Selection*

MRS. VAN VOLKENBURG

2. Music.....

MRS. WAY

3. Music.....

MR. DESSON AND MR. CARPENTER

4. Banjo Solos..... *On the Mill Dam*
Cupid's Victory

MISS WILLIAMS

5. Piano Duet..... *Overture, "Martha"*

MRS. HAGAN AND MRS. BENNER

6. Reading..... *Selection, Holmes*

MRS. BIRCH

7. Violin Solos *Liebesleid*

Nobody Knows de Trouble I've Seen

MRS. SUNDERVILLE

8. Piano Duet
- Weigenlied*

MRS. CARPENTER AND MRS. HAGAN

9. Piano for Songs.....
- Faculty*

MR. DESSON

This was followed with light refreshments, at which a birthday cake of generous proportions presented by the faculty was cut by the Dean. Dr. and Mrs. W. G. Hollingworth, of Utica, N. Y., were guests of honor. The Doctor, who had lectured at the Forum in the afternoon on "The Successful Veterinarian," gave a short address. This was followed by a few words of appreciation by the Dean. After singing "Alma Mater" the guests departed, wishing Dr. Moore many happy returns of the day.

MORE GOOD HORSES NEEDED

THE thing most needed in the production of work horses for American farms is greater care in the selection of the stallion and the brood mare.

Not only was there a net decrease of approximately 373,000 in the number of horses on farms on January 1, compared with a year ago, but there has been an even more marked decrease in the number of mares bred during 1919. The extent of this decrease can not be accurately determined until the colt crop of 1920 is estimated. However, if the decline in breeding is as great as conditions now indicate, the country will be confronted with a seriously depleted supply of good horses within the next few years.

Many farmers are using up their work stock without making any provision for the future. Such a policy is short-sighted and will have serious results. The present need is to increase the percentage of efficient horses by careful selection of parents. One of the principal factors from which the market is suffering is the breeding of too many low-grade work animals.

FARM COW A NATIONAL ASSET

The farm cow that gives milk for human food stands first, with a total value of \$2,022,000,000, as compared with other classes of farm animals for January 1, 1920. Not even the total value of all other cattle is equal to the value of the dairy cow.

The average price per head of milk cows in this country has increased from \$58.25, since January 1, 1915, to \$91.95, the average for 1919, or a gain of 58 per cent in five years.

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THE INTERNATIONAL VETERINARY CONGRESS

IN order that our readers may have some idea of the views held by one of the leading French veterinary journals regarding the plans inaugurated at the recent New Orleans convention to invite the veterinarians of the world to this country for the next International Congress, we call attention to the following editorial which appeared in the January 15, 1920, number of the *Revue Générale de Médecine Vétérinaire*, which is self-explanatory:

"The grave question of the International Congress of Veterinary Medicine enters a new phase.

"The American Veterinary Medical Association, in session at New Orleans from the 17th to the 22d of November last, passed a motion toward having the next International Congress meet in the United States in 1921 or 1922. A committee composed of Drs. Merillat, Van Es, White, Mohler, Torrance, Cary and Eichhorn was appointed to get into communication with Dr. De Jong, Secretary General of the old Permanent Committee of the International Congresses, and with Sir Stewart Stockman, Secretary General of the interrupted Congress inaugurated at London August 2, 1914.

"Now the Conference of the Allied and Associated Academies, held at London in October, 1918, adopted the following resolutions:

"As soon as circumstances permit, the conventions relative to

international scientific associations will be, in accordance with the statutes or rules of each, denounced by the competent groups in the nations at war with the Central Empires. New associations considered useful to the progress of the sciences and their application will be established henceforth by the nations at war with the Central Empires, with the eventual concurrence of the neutrals.'

"The conferences of Paris (November, 1918) and Brussels (July, 1919) confirmed these decisions and prepared the new groups.

"There seems to be no doubt that the International Congress of Veterinary Medicine, with its international office at The Hague, must obey these directions if they do not wish to exclude themselves from the scientific world.

"The United States and Great Britain were represented in all these conferences; those countries have agreed to the rules formulated.

"Even admitting that the American Veterinary Medical Association is ignorant of these irrevocable decisions, its initiative is not explained.

"On the other hand, the consequences of it are easily discerned; the permanent office at The Hague would be continued in operation, and there would be a return to the pre-war situation; we are thus advised by the Scandinavian and Dutch scientists, with a pedantic incomprehension, to 'throw up the sponge.'

"We have always forbidden ourselves in this journal to indulge in loose invective and noisy excommunications; but we consider that the decisions of the Conference of London are binding upon our profession and its representatives.

"For us, the permanent office at The Hague is nonexistent. It is for the delegates of the Allied and Associated Nations to constitute a new grouping, which the neutrals may join or not.

"For us, the seat of the new permanent office should be at Brussels, the legal seat of the Council of Scientific Research.

"For us, the next Congress can not be held in the United States. It is proper that the Congress of London, interrupted by the German aggression, should be concluded at Brussels."

The subject of future international scientific relations was discussed also by Prof. Léon Guignard in his presidential address at the annual meeting of the French Academy of Sciences. He told of the Interallied Academic Conference held at Brussels which resulted in the definite founding of the International Council of Scientific Research, in which neutral nations were invited to collaborate, but from which the Germans and their allies were to be excluded until they had made "rightful reparation and the necessary guarantees." The results of the meeting at Brussels had scarcely become known, he said, when a group of members of certain academies in neutral countries filed a petition with the learned

societies of the Allied Nations asking them to resume pre-war relations with German scholars and scientists.

Professor Guignard, in the true spirit of science, recognized the fact that no scholar worthy of the name "should refuse to take an interest in any idea that may be promulgated throughout the world, no matter who the author may be, even though it should be his bitterest enemy"; but, he added, "he can take interest in it without coming into personal contact with the author."

This statement seems to represent the attitude of the French scientists.

THE VETERINARY PROFESSION AND THE PHARMACOPŒIA

THE great work of the decennial revision of the United States Pharmacopœia was put under way by the convention which met in Washington in May. The meeting decided certain general principles and intrusted the task of making the revision in detail to a committee of fifty, consisting of 17 medical and 33 pharmaceutical representatives. New officers and trustees were elected, Dr. Reid Hunt of Harvard University succeeding Dr. Harvey W. Wiley as President.

Although the veterinary profession as such has no representation in the pharmacopœial organization, it was represented incidentally in the convention by Drs. J. R. Mohler and R. W. Hickman, who were respectively a delegate and an alternate from the United States Department of Agriculture. During the week preceding the meeting the subject of the admission of the American Veterinary Medical Association to membership in the pharmacopœial body was taken up with several of the trustees, and while they expressed themselves as very favorably disposed toward the proposal, it was found that no action on it was possible at the meeting because of insufficient time and because the requirements of the constitution could not be met at once. To be entitled to representation an organization must have been incorporated for at least five years before the decennial meeting, while we have been incorporated less than that period. The belief was expressed that if the request were renewed in due time before the next decennial convention it would receive favorable consideration. Our profession is indeed fortunate in having staunch friends in the principal officers and on the Board of Trustees and Committee of Revision, who recognize the value of the work that has been done by veterinarians in toxi-

cology and in determining the physiological action of certain drugs.

In order that our Association may obtain representation in the next decennial convention, which will meet in 1930, we must conform to the requirements and see that formal application for membership is made in due time. This must be done not less than three months before the convention meets, and may be done earlier. This matter should be kept in mind particularly by the younger members of the profession and by those who are teaching *materia medica* and therapeutics in the veterinary colleges.

In the meantime, without waiting for formal admission to the next convention, a way is open for our Association to make recommendations to the present Committee of Revision. This can be accomplished by the appointment at our Columbus convention of a special Committee on Pharmacopœia, charged with the duty of taking up the subject in a systematic manner, preparing a list of drugs to be recommended for inclusion in the Pharmacopœia, and submitting it to the Committee of Revision.

In making up such a list it is advisable to propose only a few drugs and to select those against which no prejudice has arisen in their use by physicians. Several drugs which have almost dropped out of use among physicians are still used in a large way in veterinary practice. The following, for example, are suggested for consideration by the proposed committee: Areca nut; arecoline hydrobromide; barium chloride; lobeline sulphate; potassium arsenite. The reasons for asking for the inclusion of these articles are that they have therapeutic usefulness in veterinary practice, are largely used, are on the market without a standard for purity, and if included in the Pharmacopœia will be improved in quality by the manufacturers.

The Committee of Revision of the Pharmacopœia has a subcommittee on scope, of which Dr. H. C. Wood, of Philadelphia, is chairman. It would be well for the suggested committee from our Association to confer with Dr. Wood and thus bring to the attention of the Committee of Revision the requirements of veterinary practice and the advanced position of veterinary medicine. If this is wisely done it should also pave the way for the admission of delegates from the A. V. M. A. to the next Pharmacopœial Convention.

HANDICAPPING THE BUREAU OF ANIMAL INDUSTRY

AS passed by Congress the Agricultural Appropriation Bill for the coming year has reduced last year's appropriations by \$1,281,235. As the lawmakers not infrequently do, they pruned the tree in the wrong place. Real economy is always desirable, but there is much dead wood and many parasitic growths on some of the other branches that certainly require more prompt and heroic treatment. Our legislators took the knife in hand and with a profound lack of discrimination cut right and left, in the process lopping off many branches already heavy with the promise of fruit.

Specifically the cuts were in these items:

From live-stock demonstration in areas freed of ticks....	\$50,000
From dairy work.....	10,950
From military horse breeding.....	16,940
From the investigation of animal diseases.....	14,400
From dourine eradication.....	20,000
From hog-cholera eradication.....	218,945
From foot-and-mouth disease insurance fund.....	950,000

The effects of these severe reductions in its available money must be serious, especially coming at a time when the dollar buys so much less and when to retain men in the service it is necessary to pay them better. The \$50,000 devoted to showing the people in territory freed of cattle ticks how best to utilize their new conditions comprises the entire item, and the farmers of those regions must now be abandoned to their own devices. The cut in the dairy item will mean curtailment in the formation of cow-testing associations that have so successfully eliminated the worthless cows from the herds. It will mean also a reduction in the work of teaching the utilization of milk heretofore wasted by ignorant methods. Nearly half off the item for supplying the Army with the right sort of horses means a corresponding cut in that work, with the ruin of a system developed by eight years of studious planning. A more than 10 per cent cut in the investigative animal-disease work means a slowing down all along the line in an activity in the achievements of which the Bureau may indulge in pardonable pride. Dourine eradication will also proceed more slowly, and the demands cannot be met.

If there be any branch of the tree that needs no pruning, it is that of the hog-cholera work. It is one that has borne fruit and that is yet in the full vigor of health and promise. When seven years ago the Bureau began the fight against hog cholera, 118 hogs in each

thousand died of cholera. Losses from cholera are now but 38 hogs to the thousand—an actual saving of \$40,000,000 a year based on the production of last year. In 35 States the Bureau has built up efficiently functioning machinery of coöperation with State officials. With 140 field men it has been producing splendid results. But with the heavy cut in money the work will receive a most serious check. Only about 54 men can be carried, several States must be abandoned, and forces reduced in all the rest; and once the sensitive machinery of coöperation is stopped, it becomes junk. It may be predicted with safety that several times the amount of the reduction in the appropriation will have to be spent to build up another such efficient system.

Besides these ill-considered prunings, Congress took away all but \$50,000 of the insurance against foot-and-mouth disease. Since the great outbreak of 1914-1915, successive Congresses have given authority to expend \$1,000,000 in fighting this destructive malady should it again appear. Not a cent of this has ever been drawn from the Treasury, and would not have been, except to protect the country from the frightful losses of foot-and-mouth. Consequently, while this reduction of \$950,000 looks like a saving of money, yet it is not, and if while Congress is not in session the disease should creep into the country by any one of thousands of obscure avenues, the day that the legislators took away this insurance will have been a costly one for the live-stock industry of the nation.

To be fair some note should be made of the increases which Congress allowed. The funds for looking after the inspection and testing of animals for export were raised by the munificent sum of \$2,000 and the great meat-inspection work was given an increase of \$24,300. Also, without increasing the amount actually appropriated, Congress made available for operating expenses \$300,000 more of the tuberculosis eradication money. This item amounts to \$1,500,000. Heretofore, only \$500,000 could be used for operating expenses. Next year \$800,000 will be available for this purpose, the remaining \$700,000 to be used for indemnities.

Notwithstanding these various reductions it is understood that the Bureau contemplates recommending a series of promotions involving nearly half a million dollars. This is to be made possible by economies which are to be effected by consolidating some of the field offices and forces and combining and enlarging the duties of certain positions, thus bringing about a more compact and intensive organization and a reduction in some of the overhead and other

expenses. A way will thus be found to reward in some measure the faithful, efficient and loyal employees who have stood by the Bureau despite the temptation of greater remuneration on the outside.

TRANSFER OF THE VETERINARY CORPS

IN an editorial which recently appeared in *The Rider and Driver* the statement is made that the propaganda they started last December to bring about a separation of the Remount Service from the Quartermaster Corps has met with general approval. One high-ranking officer of the Remount Service expressed his approbation of the sentiment regarding a separation by suggesting that it would probably be better not to ask for a complete severance, but rather "to have the Remount Service 'a corps within a corps' as the Veterinary Corps is a corps within the Medical Department." Strange to say, the editorial further states that "a veterinarian has nothing to do with the health of persons and it is therefore difficult to see why he should be under the jurisdiction of the Surgeon General, unless it be for reasons of political policy." The veterinary officer's activities in meat inspection and milk inspection as the protector of the health of the personnel of the Army are evidently unknown or not properly understood. Furthermore, it is suggested as a matter of propriety that the Veterinary Corps, as well as all animals and all animal-drawn transportation, should be a part of the Remount Service. The request is made to harmonize the various diverse opinions and unite to attain that end. Views which we have received from a number of the members of the Veterinary Corps are decidedly in opposition to the views expressed in *The Rider and Driver*.

The Canadian Veterinary Record has entered the field of veterinary journalism. It is issued from the Ontario Veterinary College at Toronto and claims the distinction of being the only veterinary journal published in Canada. The initial number, for April, 1920, is modest in size but of good appearance and contains a good variety of material. Only two issues are contemplated for this year, but if these meet with sufficient favor it is the purpose to issue the journal quarterly thereafter. The subscription price is but \$1 a year. We congratulate our Canadian colleagues on their enterprise and extend our best wishes for success.

PARASITIC DISEASES IN THEIR RELATION TO THE LIVE-STOCK INDUSTRY OF THE SOUTHERN UNITED STATES¹

By BRAYTON H. RANSOM and MAURICE C. HALL, *Washington, D. C.*

GENERAL CONSIDERATIONS

THE present indications are that the cattle tick will soon be eradicated from the United States, possibly within a very few years, thereby bringing to a close a campaign of extermination against this pest which has already lasted over 12 years. This campaign has been an epic in the history of American veterinary medicine. Now that the end of the campaign is in view, it is not amiss to cite those who have coöperated in the campaign, for distinguished service, especially the field service of the Bureau of Animal Industry and the veterinarians of the South, and to congratulate the live-stock industry of the South on the pending total destruction of the tick and its works within its borders, not under an armistice, but on terms of annihilation for the tick.

But with the eradication of the tick and the increase in the live stock of the South, made possible by tick eradication, it will undoubtedly develop that a great task has been completed only to uncover tasks in the control of other parasitic diseases of but little less importance. For the same climatic conditions of warmth and moisture that made the cattle tick a thriving pest are favorable in varying degree to other parasites, and with an increasing number of cattle, sheep and swine there will come increasing infestations because of larger numbers and closer pasturing in a warm, moist country. As a matter of fact the time is already at hand when serious attention must be given to the question of the internal parasites of live stock in the South, if much of the benefit of tick eradication is not to be lost. There have been instances in various localities in which live-stock projects confidently undertaken following tick eradication have almost at the outset sustained losses from parasites.

In warm countries wherever there is an abundant rainfall the diseases caused by animal parasites that may be only annoying or occasionally troublesome in cooler climates assume an immense importance. One of the great problems that must be solved before

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

such countries can reach the highest plane of development is the problem of eradicating or controlling parasitic diseases, not only those affecting human beings directly but also those affecting live stock. These diseases in the past have been among the fundamental factors that have influenced the course of history, and the future of civilization in the warmer regions of the earth is likewise dependent in no small degree upon the extent to which man succeeds in controlling his parasites and those of his stock. In the past he has for the most part blindly adjusted himself to the limitations imposed by them. In the future, however, with a constantly increasing store of knowledge gained from experience, and particularly from scientific investigation, he will gradually become able to maintain himself and his flocks in prosperity under climatic conditions that formerly permitted only a meager existence.

Heretofore the presence of the tick in the Southern United States has stood solidly in the way of a prosperous cattle industry and has prohibited a highly developed agriculture. Now the tick is rapidly disappearing from the South and will undoubtedly soon be completely exterminated within the borders of the United States. Already, therefore, we have before us an example of a profound modification in the course of development of agriculture over a vast area, brought about by the conscious control of a destructive animal parasite. That southern agriculture has been fundamentally affected by tick eradication and will be increasingly modified by this fact hereafter is unquestionable. Whether, however, the live-stock industry in the South as a whole can be brought to a high degree of development as it is understood in more northern latitudes is as yet problematical. The easy optimism of those who assume that with the conquering of the tick an intensive system of animal husbandry can be established upon a basis of the methods followed in cooler climates is not shared by those familiar with the facts concerning animal parasites.

The eradication of the cattle tick is only the beginning of the campaign of suppressing the parasites which must be suppressed in the South before the numbers of live stock can be greatly increased. It is true that tick eradication renders possible a live-stock industry on a scale formerly impossible, but the presence of other parasites potentially and actually as destructive as the tick constitutes a menace under which the industry can not thrive and which if disregarded will surely and seriously impede the development of southern agriculture. Unlike the tick, these other parasites are mostly not peculiar to the South but range far to the northward.

As a rule, however, in the North they do not limit the production of live stock greatly below the number that may be supported by the quantity of readily available feedstuffs. In the South, on the other hand, the capacity of the soil in the production of food for animals can be utilized only to a very slight extent, notwithstanding the eradication of the tick, unless measures are taken to eradicate or control other parasites as well.

Formerly, because of relatively small numbers of live stock and because of their generally small value, the damage done by parasites or the damage they are capable of doing under southern climatic conditions attracted comparatively little attention, and the veterinarian has commonly neglected the subject of parasitology. Now, however, an emergency has arisen, in the face of which the question of animal parasites in the Southern United States must be given serious consideration by the veterinary profession and by all others interested in the welfare of the live-stock industry. If it is to live up to its previous excellent record of achievement in the fields of research and practical accomplishment, the veterinary profession of this country must lose no time in preparing to meet the demands that will be made—in fact, that are even now being made—for protection against the inroads of animal parasites upon the southern live-stock industry. Already following tick eradication in many sections of the South evidences of serious trouble from parasitic diseases among augmented herds and flocks are becoming apparent. This condition must be met with effective measures of relief, or much of the potential benefit of tick eradication will be lost. Furthermore, it is important that these relief measures be promptly forthcoming if a severe setback in the movement for more and better live stock in the South is to be avoided. Losses that occur occasionally in an established industry are commonly accepted with equanimity, but the discouragement that follows losses, especially serious losses, when one has just undertaken a new enterprise, is apt to drive beginners out of the field and give the undertaking a reputation that will not soon be lived down.

Unfortunately, because of our lack of knowledge concerning methods of controlling many of the parasites of live stock, and because of the lack of means for putting into effect the knowledge already available, it is not likely that much headway will be made in the immediate future toward a practical solution of the parasite problem in the South. Therefore it must be anticipated as a matter of course that many of the ambitious plans for a rapid and extreme development of the live-stock industry in southern localities will

come to grief. It is the duty of the veterinarian to endeavor to restrain over-enthusiasm among his clients and to caution them against a careless optimism that may tempt them to go beyond the yet poorly defined limits of safety in the management of live stock in the South. As already mentioned, disaster may come at the very outset, but even though the first few years may be marked by no serious trouble from parasitic disease, this experience can not be taken as a criterion by which to judge the future. It frequently happens, as many have learned to their sorrow, that when live stock in considerable numbers are introduced into an area formerly free from live stock, or only sparsely stocked, the animals flourish for a time, but sooner or later, if the climatic conditions are favorable for the propagation of parasites, the early profits of the owner are swept away by parasitic diseases. At first the parasites brought in by the new stock or already present in the native stock are too few in number to cause any material damage, and only as they become more numerous with the lapse of time does the havoc begin.

It is proper that the live-stock industry should be encouraged in the South, but the tendency to plunge ahead along the lines established by experience in northern climates should be restrained and caution advocated.

Much investigational work must be done before it will be possible to outline comprehensive methods of managing live stock under southern conditions so as to avoid serious damage by internal parasites, but there are general rules of prophylaxis against these pests whose observance by the live-stock owner will help materially to prevent losses from parasitic diseases. Most veterinarians are familiar with these rules, but some of them may well be repeated here.

A large margin should be maintained between the number of live stock actually placed on a given area and the number that area will apparently support judged by northern standards. Provision should be made for frequent movement to fresh grazing lands, the use of permanent pastures should be minimized, cultivated forage fields utilized as much as possible, and low-lying, swampy areas avoided. Because the parasites of horses, of swine, and of ruminants are in general not intertransmissible, these three kinds of animals may be grazed in turn upon the same fields with little risk of serious spread of parasitic diseases from one kind to another. Because the dog is a necessary agent in the spread of a considerable number of more or less dangerous parasites of live stock, as well as of certain parasites of man, the welfare of the live-stock industry and human welfare in the South as elsewhere demands the suppression of the

wandering dog. Live stock known to be seriously parasitized should not be pastured with others, but generally it is useless to attempt to prevent the introduction of internal parasites. If not already present, parasites of various kinds are almost certain to be introduced irrespective of any practically possible precautions that may be taken. Hence, the live-stock industry amid surroundings favorable to parasites must be conducted under the assumption that the parasites are always present and liable to cause great damage if given an opportunity. This opportunity may come with an unusually wet season or through failure of the live-stock owner to observe the precautions necessary for the control of parasites under prevailing local conditions.

In the development of special methods for the control of internal parasites, including methods of destroying them by medicinal treatment, considerable progress has been made in the case of some of the common parasites in the South, and these methods, supplementing general preventive measures, such as those that have been outlined, will often prove useful in reducing losses from parasitic diseases. For example, the bare-lot method devised by Dalrymple is highly effective in preventing the infection of lambs with nodular worms, and the copper-sulphate treatment is remarkably successful in destroying stomach worms. In the case of a number of other important parasites we also know of special preventive measures and methods of treatment, but our knowledge is on the whole extremely inadequate for meeting effectively the practical needs of the live-stock owner. Therefore, to best serve the interests of the southern live-stock industry, the veterinarian must not only secure the widest possible application of what little knowledge we have of controlling parasitic diseases, but he must do all that he can to promote research work on these diseases in the South.

The various Southern States could well afford to establish within their borders special laboratories and field stations for carrying on such research work in actual contact with local conditions. The establishment of several such laboratories in the South is important, not only because more rapid progress can be made toward a solution of the problem of controlling parasites by multiplying the number of investigators working on the problem, but also because the problem is bound to vary considerably in different localities, and hence to secure the best results investigations should be carried on in different places. Because it is specially important at the present time that as rapid progress as possible be made in the development of methods of controlling parasitic diseases in the

South, it seems highly desirable to organize the work so that it may go forward simultaneously in a number of localities. In view of the lack of qualified investigators in this field, it will not be possible to inaugurate the work on as large a scale, perhaps, as that we have indicated, even if all the States concerned were willing to go ahead with it; but we believe that if the work should be started in one or two States the benefits would soon become so apparent that it would be quickly taken up in other States, and that meanwhile with the demand for workers in parasitology a sufficient number of young men with a leaning toward research work would prepare themselves as parasitologists to become available as needed. Notwithstanding the capable work in parasitology of such men as Dalrymple, Francis, Cary, Dawson, and others, the subject has scarcely been touched in the South. Because the attention of these men has had to be devoted for the most part to other pressing questions in veterinary medicine, the work they have done in parasitology has necessarily been incidental and fragmentary. There is thus awaiting the investigator a fertile field for research in parasitology in the South. It is a fascinating field for the investigator, both from the purely scientific standpoint and from the standpoint of the immediate practical importance of the results to be obtained. We trust that the next few years will bring into this field a rapidly increasing number of capable, energetic workers, and we are confident in the light of the past history of scientific research that the results of their work can not fail to be of vast benefit to the southern live-stock industry.

SPECIFIC PARASITIC DISEASES

As an indication of what the South will have to contend with in the way of parasitic diseases, we are calling attention, in the following discussion, to some of the more important parasites.

Stomach Worms

Of the parasites that may be confidently expected to take toll of animals in the South, the stomach worm of sheep and cattle is one of the most important. So far as the South has already built up a live-stock industry in sheep and cattle, it has learned of the danger from this worm and has already suffered quite generally from it. With the advent of more cattle and sheep, this parasite will do more damage and require more attention from the veterinarian. It will be necessary to treat animals for this disease and to advise owners with reference to prophylaxis. On both of these points we are rather well supplied with information as to effective measures.

The copper-sulphate treatment has been found satisfactory in killing the stomach worm. In passing, however, it should be said that practically all anthelmintics are poisonous, intended to poison the worms, but incidentally poisoning the host to a limited extent. It is always advisable to use copper sulphate as early in the progress of the disease as possible, in order that the animal treated may still have the strength to tolerate the treatment and reap the benefit of the subsequent freedom from stomach worms. To wait until an animal is in an advanced stage of the disease is to await the alternative of allowing the animal to die of stomach worm or of risking a treatment that may hasten the death of an animal too greatly weakened to tolerate treatment.

Prophylaxis in this disease, as in many other nematode infestations where there is a direct life history, is built up about the fact that the eggs which will ultimately convey the disease are passed in the manure and so infect the pasture. The eggs will hatch and the resultant embryos will develop to infective larvæ in a period of time which will depend on the temperature and moisture conditions. These conditions are very favorable throughout the greater part of the South for a considerable part of the year, and the period of development of the worms will therefore be correspondingly short. Pasture rotations will have to be practiced at comparatively short intervals to be effective. It has been found that embryos will hatch and develop to infective larvæ in ten days or less under favorable conditions, and conditions favorable enough for this prevail quite generally in the South. With the abundant stand of grass in the South, a given number of sheep can be pastured on a smaller area than in the more arid plains of the West, and it should be possible to fence smaller areas in a pasture-rotation system.

Nodular Worms

The nodular worms of sheep, cattle and swine are of special interest to the southern practitioner as a result of their frequency in southern live stock. Furthermore, we are indebted to the South for some of our best studies of nodular disease, the bare-lot method of Dalrymple being one of the most interesting of the control measures used in connection with nodular worm in sheep. Nodular worms are well known, but the exact details of their life history have never received adequate attention and the investigator in the South can find here a profitable field for work. The practitioner will find it a disease that is spreading and increasing in extent and importance in the United States. It is a disease for which we have

as yet no demonstrably adequate means of treatment, and here is an opportunity for work by the practitioner and the laboratory man. Experimentally, gasoline, in doses up to an ounce, has been found to remove about 16 per cent of the adult nodular worms, but this is not a satisfactory showing and gasoline has several objectionable features.

Hookworms

Another group of parasites that have received some attention in the past and will need more in the future are the hookworms of sheep, cattle and dogs. The clinical aspects of hookworm disease in man and in dogs are already familiar to you. You know the train of consequences that follows the persistent loss of blood from the numerous small hemorrhages due to hookworms—the anemia, the edema, and dropsical conditions resulting from the impoverishment of the blood, the ultimate weakness and emaciation resulting from heavy infestations, the retardation of growth and development, the diminished resistance to other diseases, and the occasional deaths, sometimes so numerous in the case of dogs that breeding kennels in some places have become unprofitable.

Infestations with similar worms, having the same blood-sucking habit, in the intestines of sheep and cattle must produce substantially the same results. Hookworms are sometimes very numerous in sheep and cattle (we have seen thousands in one animal), and the hookworm disease of cattle has been reported from the South under the name of “salt-sick” as a troublesome disease. These parasites have probably received too little attention in this country and deserve further investigation.

Hookworms are difficult to remove from man and dogs, though oil of chenopodium and combinations of this and chloroform, properly used, may be successfully used in combating them. In sheep and cattle the presence of the complicated ruminant stomach adds to the difficulty of treatment for hookworms, and much additional work on this subject is desirable. As regards prophylaxis, the measures which are of value in the case of the stomach worm are of value in hookworm disease, but in addition one must bear in mind the possibility apparent by analogy from what is known concerning the hookworms of man and of the dog, that these parasites may enter their hosts through the skin, so that even driving animals through infected sand or mud may result in infection. It is therefore not impossible if animals are driven daily through an infected pasture that a heavy infection, equal to one obtainable by pasturing on infected pasture, may be acquired.

Lungworms

Lungworms constitute another serious pest of cattle, sheep and swine. The apparently most dependable work by foreign and American parasitologists to date all points to the conclusion that the lungworms have a simple life history, in spite of the contentions to the contrary of those who have claimed the need for an intermediate host or the alternation of a free-living stage with the parasitic stage. Lungworm embryos leave the lungs by way of the trachea and get onto the pasture in the saliva or in the feces. Arriving there they may develop to infective larvæ in the case of some species in the course of a few days, ten days or less.

There have been numerous treatments used in lungworm disease—fumigation with various gases, intratracheal injections of substances intended to kill the worms, and the injection of such substances up the nostrils. In general these treatments have an element of danger in them and proof of efficacy in killing worms is usually lacking. A treatment, however, which seems worthy of trial on the grounds that it is simple, comparatively safe, and apparently of value in improving the condition of the animals treated, is the one recommended by Herms and Freeborn. They recommend the injection of chloroform into the nostrils with a medicine dropper, giving sheep 3 mls, swine 5 mls, and calves 11 mls. The nostrils are closed with the fingers until the animal is groggy. The treatment is repeated once or twice at five-day intervals if necessary. It is recommended that Epsom or Glauber's salt be administered two hours after treatment. Nursing treatment is also advisable. The animals should be put on safe pasture or put up and well fed, with a view to building up their resistance and tiding them over the danger until the worms die.

Ascarids

Another group of worms which are of importance in the South are the ascarids or maw worms. These worms are of more importance as intestinal parasites of swine, horses and dogs than of cattle and sheep, but in some cases at least ascarids as larval forms in the lungs may do considerable injury even where they do not complete their development and appear as mature worms in the intestine. Comparatively recent work has shown that the former concept of the life history of the ascarids was incorrect in some respects.

It has been generally supposed until recently that ascarid eggs were passed in the feces and an infective embryo developed in the egg, and that when these eggs were swallowed by suitable host

animals the embryo was released in the digestive tract and there developed to the adult worm. It is now known that when such infective eggs are swallowed by a suitable host the embryos after hatching in the intestine make their way to the lungs, probably in the blood stream, and reach a certain stage of development in the air passages of the lungs. They then ascend the trachea and are swallowed, subsequently, if the infested animal be a suitable host, becoming mature in the intestine. It has also been found that when ascarid eggs are swallowed by some animal other than the normal host, as when the eggs of the swine ascarid are swallowed by the rat, the embryos will escape and travel to the lungs, undergoing development to a point where they will ascend the trachea and descend the esophagus. Further development, however, does not take place, and the larvæ are passed out of the body in the feces.

It seems quite likely that there is no distinct ascarid of the sheep, as ascarids are apparently too rare in sheep to keep the species in existence if they depend entirely or principally on this host. It is practically certain that these worms are swine ascarids in an unusual host. Ascarids seem poorly adapted to life in sheep and are usually immature forms, smaller than the swine ascarid. It seems likely that sheep must swallow infective ascarid eggs quite frequently, that the embryos may commonly travel to the lungs, and that very few of the resultant larvæ ever develop in the intestine. If this supposition is correct, we may sometimes find cases of verminous infection of the lungs in sheep caused by young ascarids. This has been found to be the case in swine. Lung troubles in young pigs have long been a source of perplexity to the men interested in hog cholera and swine plague. The compilations of these two diseases that make such a polymorphic picture have additional complications in the form of lung lesions that were difficult to place with either disease. These lesions, characteristically bright-red hemorrhagic points, have been found experimentally and in the field to be due to larval ascarids, capable in heavy infections of killing animals.

Another interesting phase of this matter is the fact that these larval worms have been found to be associated with the complex of symptoms known as "thumps." The explanation commonly given as to the cause of "thumps" has been that it was due to a reflex action of the diaphragmatic and cardiac nerves from a stimulus originating in the digestive tract, the reflex being readily aroused when animals were exercised or excited, especially when the stomach was full. It was noted that pigs with the "thumps" lost flesh,

became stunted, and had poor appetites. Turning animals out to pasture has been found beneficial. Present indications are that the disease is often associated with ascarid infection, the worms being responsible for the poor condition and lack of growth as well as for the pulmonary symptoms. Improvement when turned out to pasture is perhaps due to removal from continuous infection in pens abundantly infested with eggs.

While much more work must be done along this line, it is safe to say that the question which has been so often raised by veterinarians and parasitologists in the past, as to whether ascarids, after all, do much damage, can be confidently answered in the affirmative. There is very positive evidence already in hand showing the demonstrable damage sustained by animals as a result of the invasion of the lungs by ascarid larvæ, and a growing weight of evidence indicating that young animals that become heavily infested with ascarids suffer a serious set-back in growth and development. Such facts are of especial interest to the southern veterinarian, as ascarids flourish in the tropical or at least semi-tropical conditions present in a large portion of the South.

Fortunately we have satisfactory treatments for ascariasis. It may be successfully treated in the dog with American wormseed oil, the product of a plant common in the South, in doses of 0.1 mil per kilo with an ounce of castor oil, and in swine in doses of 4 mils per hundred pounds of live weight with 2 to 4 ounces of castor oil. It may be successfully treated in the horse with carbon bisulphid in 6-dram doses, two 4-dram doses at a 2-hour interval, or in three 3-dram doses at hour intervals. Ascarids are too rare in the intestines of sheep and cattle to require treatment. Prophylaxis is a matter of sanitation, of clean stables and clean pens, clean food and clean water, and of pasture rotation where necessary.

Strongyles

Of the nematodes that are important parasites of the horse, the numerous strongyles take first rank on account of their general occurrence and the fact that they occur quite commonly in large numbers. These worms belong to the genera *Strongylus*, *Triodontophorus*, *Gyalocephalus* and *Cylicostomum*, and mixed infestations with these worms give rise to a general clinical picture which has been termed strongylidosis, a picture which is complicated in individual cases by certain features characteristic of individual species of worms. The general picture is one of an afebrile condition, with an unthrifty animal, as indicated by a rough coat and poor

condition, and by disturbances of digestion, such as diarrhea or constipation. The picture is one of parasitism in general. It is apt to be associated with anemia, as a result of the blood-sucking habits of such worms as *Strongylus*, a condition which in turn is naturally associated with edema and ascites. Further complications of a very definite sort are furnished by the larvæ and agamic forms of the species *Strongylus vulgaris*.

So far as we know at present, all of these strongyles have a direct life history, the eggs in the manure undergoing a development that gives rise to an infective larval stage on pasture. But when these larvæ are ingested by members of the horse family, they take different routes in the body and undergo somewhat different lines of development, depending on the species involved. Apparently the larvæ of *Strongylus vulgaris* make their way to the posterior mesenteric artery, as a rule, though other branches from the abdominal portion of the aorta may be involved. Here the worms set up an endarteritis, with a resultant fibrinous deposit, the inflammation presently involving all the arterial tunics and giving rise to a thickening which is most pronounced in the middle coat. The diseased and weakened arterial walls dilate and the result is the formation of an aneurism, in which the strongyle may be found free or more or less entangled in the layers of associated thrombus or in the walls of the artery.

The potential danger from these aneurisms is well known to the veterinarian. They may rupture, in which case the animal dies from internal hemorrhage. Parts of the thrombus may detach and be swept away in the blood stream to become an embolus at some point. When these emboli are carried along the course of the posterior mesenteric artery, they quite commonly give rise to verminous colic by obstructing the blood supply to a limited portion of the intestine and thereby causing a cessation of peristalsis, with a condition of limited intestinal stasis in which the contents of the involved portion of intestine undergo fermentation, the intestine becoming distended with gas and the animal showing evidence of colic. Reflexes to the uninvolved adjacent portions of the intestine may cause violent peristalsis with an accompanying likelihood of intussusception or volvulus at the union of the intestine which has a normal blood supply with that from which the supply is shut off. Occasionally the gas formation will cause a rupture of the intestine, stomach or diaphragm. Sometimes the colic will clear up spontaneously by the formation of a collateral blood supply or the

absorption of the embolus, but occasional animals will die as the result of the plugging of the main branch of an artery or too great delay in restoring circulation to the damaged part, the involved intestine becoming gangrenous. Emboli which pass to the circulation of the hind legs give rise to an intermittent lameness of an annoying type, not capable of radical and permanent cure. In the course of time the agamic worms will leave these aneurisms and pass into the lumen of the intestine, where they become mature, but the aneurism persists with its constant threat to the life and health of the animal. Even aside from embolus production, such aneurisms interfere with the blood supply, nutrition and tone of the large intestine, and are probably related to the common occurrence of colic in the horse, the only domestic animal commonly afflicted with aneurisms.

On postmortem examination there are a number of striking lesions that are readily found. The mucosa of the cecum and double colon quite commonly presents numerous petechial hemorrhages as a result of the attacks of the worms belonging to the genus *Strongylus*, *S. equinus*, *S. edentatus*, and *S. vulgaris*, and these worms are quite commonly found attached to the mucosa, though some are found free, usually near the mucosa rather than deep in the ingesta in the intestinal lumen. In a paper by Ransom and Hadwen attention has been called to the fact that ulcers found in the posterior loop of the colon are due to *Triodontophorus tenuicollis*, the worms being commonly found attached in clusters to these ulcers. What is evidently the same condition has been noted and figured by Hartman, although he did not determine which species of worm was responsible for the ulcers. Numerous small worms of microscopic size may be found in the mucosa, worms belonging to the genus *Cylicostomum*, and cysts in the wall of the large intestine occasionally contain agamic forms of *S. vulgaris*, presumably returning to the intestine to complete their development. Larval and agamic forms of *Strongylus* may be found in various places, *S. equinus* showing a preference for the liver, lungs and pancreas, and *S. edentatus* occurring in various places under the pleura and peritoneum, in the hepatic ligament, the perirenal connective tissue, the muscles of the forearm, and even, perhaps, in the aorta. The last-named species has a predilection for occurring in the cryptorchid testis and has been found there in numerous cases, though frequently reported under other names.

Although strongylidosis is so common in horses the world over

that the evil effects produced are usually discounted, there is evidently a growing disposition to take this condition into consideration where horses are obviously sick or unfit but do not show a febrile temperature. So formidable an array of blood-sucking worms, such persistent invasion of the tissues, with the migrations of such large worms into such important structures as the blood vessels, can hardly be regarded as a minor matter or as something to be disregarded.

Fortunately, this disease appears to be amenable to treatment to an extent that would at first sight hardly seem likely. The available experimental evidence indicates that the strongyles of the large intestine may be very readily removed by fasting an animal for 36 hours and administering 16 to 20 mls (4 to 5 drams) of oil of American wormseed, immediately preceded or followed by a quart of linseed oil. Fairly good results may be obtained by the substitution of 2 ounces of turpentine for the wormseed oil. For horses that are on pasture it would probably be advisable to administer such treatment twice a year, since it is certain that the animals will almost always be more or less heavily infested. In keeping with the general truth that young animals suffer most from parasites, the treatment of young animals for the removal of such worms would probably be a measure of value in keeping down infestation and protecting the animal from such serious handicaps as verminous aneurisms. These young animals deserve the greatest possible amount of consideration in the selection of pastures and water supplies to insure freedom from infestation with these worms.

A comparison of the degree of strongyle infestation in horses in Michigan and in Virginia indicates that infestations are much greater as a rule in the Virginia horse, which is what would naturally be expected from the difference in temperature, the rainfall and the moisture factor near Detroit and that near Washington being very nearly the same. It is likely that horses throughout the South will show a greater number of these worms on an average than those of the North, and this likelihood suggests that the veterinarian in the South will be repaid for more than the customary attention to these parasites.

Habronema

Another group of nematode parasites of the horse which have been found of late years to be important are the species of the genus *Habronema*. These worms occur in the stomach of the horse

as adults, and in the skin and such modifications of the skin as the conjunctiva as larvæ. In the stomach one species, *H. megastoma*, is especially injurious in that it produces nodules or tumors that may attain the size of a hen's egg. The worms may be seen projecting from small apertures at the summit of the tumors. The tumors become invaded by bacteria and put out of commission as secreting and absorbing surface areas of the stomach that may be of considerable extent in some cases. Where the tumors are near the pylorus, they may interfere with the passage of food either mechanically or by irritation of the pyloric region and the production of spastic reflexes. The same worms cause abscesses in the spleen. There is said to be a considerable mortality from this worm in Australia.

It has been found that the worms present in the disease known rather generally as summer sores and locally under a wide variety of names are larval worms of the genus *Habronema*. In this disease, sores form along the ventral or lower portions of the body, and the diseased skin becomes very thick. The sores are persistent as indolent ulcerations through the warm months, but have a tendency to disappear in cold weather. Sores of a similar nature are found on the eyes, causing the disease recently named habronemic conjunctivitis.

It was ascertained in the Bureau of Animal Industry that a larval worm which had been described many years ago from the common house fly was the young form of a species of *Habronema*, *H. muscae*.

The life histories of other species have since been investigated in Australia and it has been ascertained that *H. megastoma* also has its intermediate stages in the house fly, but that *H. microstoma*, although capable of developing in the house fly, usually develops in the stable fly, *Stomoxys irritans*. Following the initial work here on the life history of *Habronema*, workers elsewhere ascertained that the worms long known to be present in summer sores were *Habronema*, which immediately gave a clue as to the mode of production of the disease. The eggs produced by the female *Habronema* pass out in the manure and are naturally ingested by fly maggots as they feed and breed in the manure. In the maggot and in the resulting fly, the worms develop to an infective larva, which is situated in the head usually, the thorax occasionally, and in the abdomen rarely. Infected flies are swallowed by horses in feeding and in drinking, especially when benumbed flies fall into feed boxes, mangers, and drinking troughs while the temperatures are low in the early morning. The larvæ from such flies apparently escape

in the stomach of the horse and continue their normal development. There is also the possibility of the larvæ escaping from the proboscis of flies as the flies feed on the moisture on the lips of horses. But the worms found in the skin of horses which have summer sores may be out of the normal line of development. It seems unlikely at the present time that summer sores arise as the result of horses lying down on floors or soil covered with manure and thereby bringing abraded areas in contact with the young worms in the manure. On the other hand, larval worms from the fly on transfer to the rich, warm culture medium afforded by a wound of any sort apparently are able to establish themselves in this location at least temporarily, their presence in the meantime causing an increase in the amount of pathological development in the sore. Whether any of these immature worms may be transferred back to the direct line of development in the horse is as yet uncertain.

As regards treatment, no adequate tests of anthelmintics for these worms in the stomach of the horse have yet been made, but American wormseed oil would probably be effective against *H. muscae* and *H. microstoma*, and in carbon bisulphid we have a very penetrating, highly solvent and quite toxic substance which exerts its greatest force in the stomach and which on theoretical grounds deserves to be tested against the ulcer-forming *H. megastoma*. In summer sores early and complete ablation of the diseased skin appears to be the best treatment.

Prophylaxis is evidently summed up in manure control and fly control. Cleanliness would evidently be of value around stables and yards in preventing fly breeding. There are a number of ways in which manure may be handled so as to prevent fly breeding, and one of these ways should be used. The maggot trap, which is essentially a platform for manure built over water, is one of these devices, and the burial of fresh manure daily under old manure to cause overheating to a temperature unfavorable to maggot development is another. The fly-tight manure bin is another device often mentioned, but experience shows that there are few of these bins that are actually fly-tight. Such a construction is difficult and rarely attained. Removing manure promptly to the fields and spreading it thin to facilitate drying is an efficient measure where it is feasible.

In the South conditions favor the development of this worm. Climatic conditions are ideal for the development of the house fly and the stable fly, and labor conditions and other conditions inter-

fere with the general adoption of measures for a more sanitary way of handling manure and raising horses. Nevertheless, with a prospect of avoiding definite evils in view, a man will do more than he will with no evident end or only a vague betterment in prospect. It remains for the veterinarian of the South to give habronemiasis attention and to ascertain the extent to which it deserves consideration. For years a disease called leeches or leeching has existed in Florida. From the available evidence in print it would appear likely that this disease is cutaneous habronemiasis, and this is something that warrants investigation. If it is this, here is an interesting field of practice and prophylaxis for the veterinarian in Florida.

Liver Flukes

Another group of parasitic pests in the South, with a well-established record of damage to their account, are the liver flukes. Both the common liver fluke of sheep, occasionally present in cattle, and the large liver fluke of cattle, occasionally present in sheep, are widely distributed over the South along the Gulf coast and back along the river valleys opening on the coast. In the case of the common liver fluke we are dealing with a disease that has a well-established clinical picture, easily recognized by the sheepman as liver rot, which does not need a nice consideration of involved factors to ascertain whether it is really injurious. It should be of interest to the veterinarians in the laboratories of the South to know that although certain species of snails have been shown to act as intermediate hosts in other countries, the snail which functions as the intermediate host of this worm in the United States has never been determined, so that here is a good opportunity for profitable research. The disease should be of interest to the practitioner in the South for the reason that it is a disease that often occasions severe losses and for which there is a medicinal treatment established by excellent authorities in Europe on the basis of critical test.

The treatment which has been recommended by the French authorities calls for the administration of oleoresin of male fern to sheep in doses of 3 to 5 grams, according to the size of the sheep, in 10 mls of a non-purgative oil, two hours before feeding in the morning, on five consecutive mornings, using male fern with a content of at least 24 per cent filicine and 3.5 per cent filicic acid. The dose for cattle is 12 to 25 grams, according to the size of the animal. The treatment recommended by the Hungarian authorities calls for the administration of powdered kamala in amounts of

15 grams, given in from 1 to 5 doses; strong animals may be given the entire amount at one dose, animals in general being given it in two doses at a 12- to 24-hour interval, and weak animals being given the treatment in five doses. The dose for cattle is 0.139 to 0.26 grams per kilo of live weight.

The large liver fluke offers even better opportunity for research in that nothing whatever is known as to the intermediate host, though it is presumably a snail. This parasite seems to be more pathogenic for sheep, though of more common occurrence in cattle. It is of interest in meat inspection in that it occasions considerable aggregate loss from condemned livers. No treatment has yet been developed, and it would be of considerable interest to know how the male fern and kamala treatments would operate in cases of infestation with this worm.

Prophylaxis in the case of both these flukes is evidently a matter of keeping sheep off wet pasture. Since much of the pasture in the South is of this sort, it is evident that attention should be directed to draining such pastures wherever feasible. Where there is only a small amount of such pasture on a farm, this pasture should be fenced off from sheep as dangerous, and if it must be used it would be advisable to use it for mature horses and cattle and not for sheep or young animals of any sort, and to use dressings of lime and salt in June, July and August to kill embryos and larvæ of flukes and to kill and repel snails. It is said that sheep never become infested with flukes on salt marshes. Infected sheep should be isolated and treated or else butchered before they have lost condition and become unfit for food. Where fluke is present it is advisable to treat the flock at the beginning of the winter after the danger from fresh infestation is past. Safe drinking supplies are essential, as the infection may be water borne.

Miscellaneous Parasites

The tapeworms of sheep and cattle constitute a group of parasites which are distinctly detrimental to the health, growth and development of the host animals, according to a growing mass of evidence. At the present time they present an attractive field of research to the veterinarian in the South and elsewhere, as the life history of none of these tapeworms is known and we are therefore without knowledge of suitable prophylaxis, and have moreover little evidence with regard to a satisfactory treatment.

The screw worm and the wool-maggot flies are pests with which every veterinarian in the South should be familiar. The screw

worm is now and has long been a cause of serious losses, and the wool-maggot flies have become such in Australia and may become equally important here. Treatment for screw worm usually consists in pouring chloroform into the affected places, later removing the maggots with forceps, washing with a disinfectant, and covering with pine tar to prevent fresh attacks. Preventive measures are of importance to the southern veterinarian in his surgical work, as operation wounds may readily become infested with screw worms unless covered with pine tar or similar repellents. Similar treatment and prophylaxis applies to the sheep-wool maggots.

A measure of great importance, and one that needs special emphasis in the South, is the prompt destruction of carcasses. Farmers and stockmen are often not very careful in regard to the disposal of carcasses. They are frequently allowed to lie in the fields to rot. On the dry prairies of the West such carcasses may speedily dry to the point where flies can no longer breed on them, though even there fly-breeding in such carcasses is common; but in the South these bodies offer exceptional opportunity for screw worms, flesh flies and blow flies of many kinds. The flies which are accustomed to produce the various sorts of fly-blow in stock are flies which habitually blow carcasses, and the habit of attacking live animals appears to be a rather recent one. In some species in Australia the habit of attacking sheep is one that has developed within the memory of the present generation, and other species appear to be acquiring the habit. The more plentiful the flies are, the greater number there will be seeking favorable places for depositing their eggs, and the greater likelihood of wounds, matted wool, and other places on animals being used for the purpose. Conversely, the destruction of each carcass diminishes the number of future flies by thousands and tends to restrict the activities of the smaller number that are produced. There has long been an attractive bit of poesy about the fly that takes the unattractive material afforded by the rotten flesh, manure heaps, and other unesthetic objects and converts it into a beautiful winged thing. Such poetic imagery begins to limp a bit when the fly begins to convert wool and mutton and beef into flies, thereby preventing the wool from going into clothing and the meats into sustenance for man. A similar happy-go-lucky policy with regard to the turkey buzzard as a scavenger has allowed that distributor of anthrax and hog cholera to thrive and multiply. Neither poetry nor laziness can make a good case for the man who leaves a rotten carcass to Nature to dispose of, when he should attend to it himself. Nature

will dispose of it, but without reference to the health of the man and his live stock or the effect on the purse. Carcasses in the field breed flies, disease, trouble and financial loss. The veterinarian in the South can do much educational work along this line among his clients. Another field in which the southern veterinarian can do much for his clients is along the line of ox-warble control. Where there have been concerted efforts to combat this pest by squeezing out the warbles from the backs of cattle and destroying the grubs, great benefit has been reported.

Conclusion

There are many other parasites that might be mentioned, but enough have been discussed to indicate the importance of the subject to the southern veterinarian. The very fact that the South has a semi-tropical climate, in some places practically a tropical climate, and that parasites are of major interest in the tropics, warrants an interest in this subject. It is not without reason that Tulane University in this city has a School of Tropical Medicine, one of the two in this country. For that matter, courses in tropical veterinary medicine might well be added to the curriculum of the veterinary schools in the South, and a one-year postgraduate course along this line would undoubtedly produce wonderful results under capable direction. No one in the South has yet made and published the results on a series of, say, 100 postmortem examinations of dogs for parasites, and yet the casual examinations that have been made disclose such interesting findings as a species of echinorhynch in Texas. It is highly probable that the establishment of research and postgraduate work along the line of parasitology in the South would not only greatly increase our information concerning known parasites, but also bring to light new parasites and new parasitic diseases, and that some of them might easily prove to be of great importance. Such departments would give a stimulus to the southern practitioner in studying parasitic conditions and aid him in his practice by advice and actual assistance where necessary. We have had enough instances in recent years of important parasitic conditions being overlooked or confused with other conditions, such as sheep measles and ascarid pneumonia, to demonstrate that there is much that we do not know that should be known. This is perhaps truer of parasitology than of most fields of veterinary medicine, and the southern practitioner or laboratory man who spends time in a serious consideration of this topic is spending it on a subject that promises abundant returns and rewards.

THOUGHTS ON INSECTS IN RELATION TO PRODUCTION OF LIVE STOCK AND POULTRY¹

By F. C. BISHOPP, *Dallas, Texas.*

AS suggested by the title, my remarks will be of a more or less rambling nature. While no doubt much that I shall say is well known to many of those here, it is my hope that this discussion will direct your attention to the importance of insects to the live stock and poultry industries, to the multiple bearings of insect problems on the successful development of these industries, and above all to suggest points of common interest between the veterinarians and the entomologists. Perhaps also some ways may be indicated in which workers in these fields may be of mutual help in solving some of the problems relating to prevention of disease and abatement of insect nuisances.

WAYS IN WHICH INSECTS CAUSE LOSS TO THESE INDUSTRIES

Insects materially affect live-stock production by depredating on ranges, pastures and crops which are depended upon for feed. This indirect relationship between insects and live-stock production will not be discussed here. There are, however, many ways in which live stock and poultry are directly affected by insects and related forms of animal life.

Insects and Disease

The relationship of insects and related forms to the spread of disease is a subject which has received much attention during the last few years, and even now it is safe to say we are just beginning to explore the fields in this direction. A rather crude survey of the literature indicates that there are about 150 different disease organisms which invade the warm-blooded animals, including man, in the transmission of which insects are more or less certainly connected. The number of species of insects concerned with the spread of these diseases is approximately 250. This does not include the several hundred species which cause injury or annoyance by their direct attack on animals. The major part of these insects have been studied in connection with the transmission of the different diseases of man. It is possible that animals even more frequently than man

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

serve as hosts for insect-borne disease organisms, owing to their greater exposure to attack of possible transmitters. It is also probable that a number of our more or less common diseases of live stock and fowls may be disseminated at least to some extent by insects, and in the case of those maladies, the etiology and method of spread of which have not been definitely determined, insects should be given careful consideration. In these categories might be mentioned infectious equine anemia, hog cholera, hemorrhagic septicemia and anthrax. In the transmission of some of these diseases insects already have been considered, although the proof of their exact relationship to the maladies has not been fully established.

Insects may act as disease vectors in two principal ways, namely, as mechanical carriers and as necessary intermediate hosts of disease organisms. The first of these groups may be illustrated by the transmission of typhoid by the house fly and the second by the carriage of malaria by anophelene mosquitoes. In the mechanical transmission of disease insects may function in a number of ways. The infection may be disseminated by blood-sucking forms, the organisms being carried on the proboscis or by being temporarily sucked up into the crop, while other insects act as carriers through their habits of visiting wounds, excrement, secretions and foods. In certain instances organisms may be taken up by insects and voided with excreta on susceptible hosts. Hence they gain entrance into the tissue through skin abrasions or through the punctures produced by the insects themselves.

It may be stated in general that those diseases which utilize insects as intermediate hosts are usually of the motile type such as the trypanosomes. The non-motile organisms such as the bacilli are carried largely by mechanical means either on the proboscis or feet of the insects or are taken up by the insect and passed out with the excreta.

In any of these groups insects may not only act as carriers of disease from one individual to another of the same species, but may carry the disease from one host to an entirely different one, as in the case of bubonic plague, which is transferred from rats to man by fleas.

In addition to the transmission of the lower organisms which carry disease, insects function to a considerable extent as intermediate hosts and therefore vectors of the parasitic worms. One of the most interesting and historic cases of this is the transmission of *Filaria bancrofti* by mosquitoes.

Injury by Direct Attack

1. *Injury due to blood-sucking habits.*—In all parts of the world, and especially in the tropics, blood-sucking insects are numerous and occur in varied forms. Of course these play an important part in the transmission of disease, but they are also of much importance as drains on the vitality of the host through the loss of blood and by introducing toxic substances into the host. In this country the most notable examples in this group are the stable fly, horn fly, the various horse flies, mosquitoes, buffalo gnats and ticks. They exhibit a wide diversity of habit and are to be found in all parts of the country. Under most favorable conditions any one of the forms may develop to serious proportions.

2. *By living in the host.*—The number of species concerned in this type of injury is comparatively small, consisting mainly of the bots and warbles and certain mites which infest the lungs and other tissues of the animal. The total amount of damage caused by them, however, is large. By their attack tissue injury is suffered, digestion interfered with, pus development encouraged, and nervous and other disturbances produced.

3. *By destroying tissue.*—A limited number of fly larvæ are known to infest wounds or attack the digestive tract after being swallowed, producing what is known as myiasis. In addition to tissue injury often generalized infections occur. As an example may be mentioned the screw worm of the Southwest.

4. *By annoyance.*—Deleterious effects from annoyance are observed in attacks by many of the above-mentioned forms. Loss of flesh, retarded development and decreased milk flow are often noted from annoyance produced by blood-sucking insects or those forms which cause great fear to live stock when they are depositing eggs, as in the case of the ox warble or heel flies and horse bots. Certain insects also worry animals a great deal by visiting the eyes and nose, and when present in great numbers by entering the air passages. Others cause annoyance by crawling over the body and gnawing at the skin, as in the case of the biting lice.

It is very difficult to weigh the losses produced by insects. Estimates of losses have been made in but few instances, but their magnitude can be judged by the following figures of losses in the United States, more or less accurately determined: Cattle tick, from forty to one hundred million dollars; ox warble, from fifty to two hundred million dollars; screw worm, four million dollars.

THE INTRODUCTION AND SPREAD OF INSECT PESTS

We find in looking over the list of our most serious live-stock and poultry parasites that the great majority of them are invaders from foreign lands. Some were evidently introduced at a very early period in the history of this country and we have no definite knowledge of how or when they came. This is probably true of the stable fly, various species of lice on domestic animals and fowls, and at least two of our common horse bots. The horn fly, on the other hand, is of comparatively recent introduction, being brought into this country about 1887. Its dissemination throughout the States, which took place during the next few years, has been rather closely followed and recorded. The nose fly or red-tailed bot fly appears to have been introduced into this country about 1898, and has during the intervening time spread over Montana, the Dakotas, and parts of Nebraska, Iowa and Minnesota.

Our native species, while fewer in number, are no less formidable in this connection. The cattle tick, it should be remembered, is probably an American species; at least the variety which infests our Southern States is distinct from forms occurring in South America, Africa and elsewhere. The spinose ear tick may be mentioned as another one of our native forms, and the screw worm is strictly American.

In considering the protection of the live-stock and poultry interests of the country it should of course be kept in mind that there are still many dangerous parasites present in other parts of the world which have not been introduced as yet. A knowledge of the importance of such parasites and of their life histories and habits, and therefore of the ways in which they are likely to be introduced, is of much importance if we are to succeed best in keeping out these pests.

There are many ways in which insects of this class can be introduced into this country from foreign lands. Animals themselves, including the lower forms, menageries, poultry, pets and large domestic animals are especially dangerous in connection with the introduction and spread of parasitic forms. Those parasites which remain on the host constantly or breed there are spread with the greatest facility. In this category are the various species of biting and sucking lice of birds and animals, the bots of mammals which spend several months in the digestive tracts or tissues of their hosts, and the different kinds of ticks which attach to their host and engorge

in periods ranging from a few hours to several months. The ticks all spend considerable time off the host while depositing eggs and while these are incubating. With those species of ticks which remain on the hosts for long periods transportation is easy, and there is some chance of other forms continuing to breed in association with the hosts in transit on boats.

Owing to the comparatively short life of the adult insects in the order Diptera, or flies, which group may be said to be the most important of the true insects in the dissemination of diseases of man and animals, there is less chance of their successful introduction in that stage from distant lands. The rapidity of modern ocean transportation is, however, greatly increasing this danger. The diverse breeding habits of the flies permit of their easy introduction in several ways. Many are excrement breeders and the young may develop in excreta on shipboard and be carried off in the immature stages or become adult in time to leave ships at unloading ports. Feed, bedding and crates should also be considered in this connection. During cold weather there is also some opportunity for adults to be introduced in a dormant or hibernating condition with feeds, packing or other cargo. Ship ballast may be a source of introduction for certain noxious forms.

Either with native or introduced pests there are many means of dispersion as well as important geographic and especially climatic bearers. The repeated recurrence of Texas fever among the northern nonimmune cattle in the pre-quarantine days is a notable example. The tick, and with it a dangerous disease organism in these cases, was introduced into noninfected territory through the shipment of the host. At the same time climatic bearers—cold and aridity—operated to kill out the tick again in the North and much of the West. A very similar set of conditions prevailed in regard to yellow fever in man. The disease once introduced wrought havoc until cold weather came and destroyed the mosquito vector, thus reducing the infested area to the warmer portions of the country. The case of the so-called European ox warble, *Hypoderma bovis*, is a good example of the effect of climatic restrictions on spread. This warble has been introduced repeatedly in the South in the bodies of cattle shipped from the Northeastern States, but it appears never to have established itself in the warmer regions of this country.

In addition to the several means of dissemination mentioned, there is a limited opportunity offered for spread in connection with the shipment of animal products as wool, mohair, hides, etc., and in

animal excreta used as fertilizer, also by natural agencies as wind, floods, etc. Furthermore, the free-flying forms—notably the flies—may spread by flight. This method of dissemination, while of much less importance than the shipment of infested animals, appears in the light of recent work to be of greater importance than formerly supposed. In experiments carried out by Mr. E. W. Laake and the writer it was determined by releasing and recapturing marked flies that they could travel considerable distances in a rather short time. Screw worm flies were recovered 15 miles from the point of liberation and the common black blow fly and the house fly 11 and 13 miles, respectively, from the point of release. We have secured evidence also which strongly indicates that a number of our common flies may by successive flights and breeding periods spread distances of hundreds of miles.

The importance of a knowledge of phenomena connected with the dispersion of insects is at once apparent when we come to a study of their relationship to disease.

In permitting the limitation of spread of species to be controlled by natural factors alone there is to be considered the danger of insects adapting themselves to varied conditions of life and thus becoming increasingly important as pests. Moreover, there may at times prevail a set of conditions which are temporarily favorable for the spread of a species and with it some dangerous disease which in turn may be carried by some other agency in the newly invaded region even after the introduced vector has disappeared.

A few other illustrations follow of pests which occur in this country and regarding which I believe the people, and especially those concerned with the enforcement of restrictive regulations along this line, should become more familiar: the fowl tick, ear tick, spotted fever tick, tropical fowl mite, nose fly and pigeon hippoboscids. Three of these are known agencies in the dissemination of disease. The fowl tick, which is one of the most serious pests of poultry in the Southwest, is gradually invading new territory, although it is believed it will always remain largely restricted to the semi-arid regions. This species is a proven carrier of a spirochetosis of fowls in South America and other countries, although this disease is not known here. The ear tick, a pest of considerable importance to cattle and other live stock, has been introduced in the Northern States of the Rocky Mountain region in the last few years, although it is largely restricted by the same climatic bearers as the fowl tick. The nose fly, which has been mentioned previously, is gradually

spreading eastward and southward from Montana or southeastern North Dakota, where it was apparently first introduced. It is really surprising that this important pest of horses has not been widely spread over the country during the last few years when many animals were shipped out of the infested territory for war purposes. There is little clear evidence that the spotted fever tick is spreading to any extent, but we know that the dangerous disease of man which is carried by this species in the northern Rocky Mountain region can be transmitted by a number of other common ticks of the country. Since we also know that the disease does not occur throughout all the territory covered by the spotted fever tick, but appears to be spreading, there is need of giving serious consideration to the question of the scattering of this tick on horses and cattle, which are the principal hosts of the adult.

In this discussion I have strived to bring out a few points which may be of some practical value in the prevention of the introduction of noxious parasites of animals and the restriction of their spread when once in this country. I think it is apparent to all that there is a need of accurate information as to the life history and seasonal history of the various forms, both native and foreign, in order that this control and quarantine work may be effectually carried out.

Often restrictions are proposed which are of doubtful value in preventing the importation of pests and which may be a serious handicap to the industries involved. It is noted that Australia maintains a quarantine on cattle shipped from the United States, Great Britain and Canada during all seasons except the period between October and May, with a view to excluding the ox warble. An understanding of the seasonal history of this pest clearly shows that such restrictions would by no means give the desired protection. Within our own country the question has been brought up of eliminating the danger of spreading the winter or elk tick into various districts. This species is a serious pest of horses and cattle as well as elk in the northern Rocky Mountain region. It has been determined that this tick is not to be found upon hosts during the summer months; hence this immediately suggests the possibility of shipping elk or other hosts from infested territory during the summer.

It is important also that consideration be given the strong probability that insects already established in a region may assume much importance as pests owing to changes in agricultural practices which often have the effect of upsetting the balance of nature existing.

COOPERATION OF A NUMBER OF AGENCIES NECESSARY IN WORKING
OUT MATTERS APPERTAINING TO THE RELATION OF
INSECTS TO ANIMALS

There is much need, it would seem to the writer, of additional data on the precise effect of the multitude of insects affecting live stock and poultry upon the industries involved. Careful work to determine the effect of a number of the important insects on the health, growth, fattening and production of animals would give the agencies concerned with control as well as the people otherwise interested a definite idea of the importance of carrying out such control measures. In but very few instances have we at hand any reliable figures along these lines. It may be that the procuring of such data would materially change our ideas as to the need of carrying out vigorous control campaigns against the different insects involved. In other words, some may be of much greater and others of less importance than we suppose. The coöperation of the veterinarian, the animal husbandman and the entomologist would greatly facilitate the accumulation of accurate data along these lines. Again, the study of the relation of certain insects to disease or the transmission of certain diseases by insects could undoubtedly be carried on with profit by similar coöperative effort. Another field of rather less importance, however, in which the entomologist feels the need of help from the veterinarian or animal physiologist is in determining the effect of insecticides upon the different hosts treated.

The carrying out of control campaigns would probably also proceed best in many instances through coöperative arrangements. For instance, in endeavoring to put into effect proper range sanitation measures we observe a many-sided problem. Carcass disposal is of the utmost importance in the warfare against certain diseases such as anthrax and blackleg. The same practice is also necessary to accomplish the control of the important live-stock pest in the Southwest known as the screw worm. In fact, we believe that should range sanitation be carried out in a thoroughgoing manner the screw worm, which now is responsible for millions of dollars of loss annually, would be rendered of little importance.

Coöperation in reporting on abundance, injury and spread of injurious species would undoubtedly materially benefit the industries concerned.

Looking forward in the field of live-stock and poultry parasite control, it may not be too visionary to picture the eradication, either

locally or perhaps nation wide, of a large number of our common live-stock and poultry parasites, just as the cattle tick is being wiped out of our Southern States. In fact, many of those pests which perhaps are of considerably less importance than the cattle tick would be much more easily eradicated than that species. The common lice of horses, cattle, goats and hogs would fall in this category, as would probably the ox warble. Poultry lice, as has been shown in recent work carried on by the Bureau of Entomology, can be very readily eradicated from flocks. It is of course possible, although perhaps not feasible at this time, to accomplish the same result throughout a community, county, State or nation as is done by the individual.

Dr. Charles B. Noback, veterinarian in the New York City Health Department for the past eight years and previously connected with the Bureau of Animal Industry, has secured a position with the Laboratorio di Higine, Bogota, Colombia, South America. The directors of this concern are Drs. Bernard Samper and George Martinez.

Dr. Noback, before leaving for Colombia, is making an extensive trip through the United States to obtain information concerning such diseases as anthrax, septicemia hemorrhagica and government regulations concerning the manufacture of biological products.

Prof. W. L. Williams, of the New York State Veterinary College, Cornell University, has been granted leave of absence from commencement through the first term of next year. He will spend most of this period in the Hawaiian Islands as advisory veterinarian on the Carter ranch, a tract of some thirty square miles on which are herds aggregating nearly 80,000 head of cattle.

Dr. B. H. Ransom, Chief of the Zoölogical Division of the Bureau of Animal Industry, has been elected a corresponding member of the Société de Pathologie Exotique.

Drs. L. A. Merillat and J. R. Mohler have been elected foreign corresponding members of the Société Centrale de Médecine Vétérinaire of France.

At a meeting of the Board of Directors of The Chicago Veterinary College held at the college May 22, 1920, it was decided to suspend operation of the college.

TICK ERADICATION IN THE SOUTH¹

By ERNEST I. SMITH, *Baton Rouge, La.*

TICK eradication is a subject that has intensely occupied the attention of the Bureau of Animal Industry and the various State live-stock sanitary boards since about 1905. Previous to that time serious losses occurred among the cattle in numerous places below the quarantine line and in instances where cattle were shipped across the line into the area known to be free of ticks. Therefore, in order to conserve fully the cattle industry in the South, it became necessary that the Federal and State forces coöperate to the end that the majority of the cattle owners of the Southern States be made to realize their predicament.

At that time, as well as later, the fundamental principle of eradicating the cattle tick depended upon securing the coöperation of the masses, and before such coöperation could be obtained it was necessary to conduct a general campaign of education, notably to convince the people of the damages that the tick was doing, and, in order that the losses might cease, devise a practicable method whereby the tick might be completely eradicated. Some learned men insisted that the officials undertake to discover a curative measure, but the majority of those who understood the life history of the cattle tick insisted that the dreaded parasite be forever eliminated from the United States.

In 1905 Dr. John R. Mohler, then Chief of the Pathological Division of the Bureau of Animal Industry, wrote Bulletin No. 78, entitled "Texas Fever, with Methods for Its Prevention." With due respect to all other similar bulletins, I believe it is safe to say that this one was the most explicit and complete that has ever been published. The color plates contained therein have served a very useful purpose and undoubtedly have helped many a perplexed mind to differentiate between the various varieties of ticks. Mohler says that, scientifically, the origin of the disease is unknown, but states that it has existed for centuries in some countries in Europe, mentioning southern France, Italy, Turkey and along the Danube River in Rumania, indicating that it is prevalent in the West Indies, Mexico, Central America, Australia, parts of Africa, Ireland, Finland, Germany, southern Russia, India, China, Japan, Java, Borneo and the Philippine Islands. He further states that the tick was

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

probably brought into the United States with the importation of cattle by the Spaniards during the early colonization of Mexico. Therefore we can readily see how it gained such a tremendous footing here in the South, because the traffic of cattle across the Rio Grande, from Mexico into Texas, was more or less continuous. We do not know just when the tick was introduced into the States, but it is safe to say that it might have been half a century ago. Therefore, in all the years that have passed, the spread of the fever tick throughout the Southern States has been an easy matter.

At the time that Bulletin No. 78 was published the quarantine line passed through about the lower third of Virginia, the extreme western end of North Carolina, zigzagging midway through Tennessee with an upshot into Kentucky, where three or four counties were included; thence across the boundary line between Arkansas and Missouri; a part of Oklahoma; then diagonally in a south-westerly direction across the western end of Oklahoma through northwest Texas to the Rio Grande River, just south of New Mexico, where it followed the boundary line between New Mexico and Arizona along the lower third of the eastern line of California; thence in an irregular manner across the State about half way up; thence across to the Pacific Ocean. Briefly, this included over one-half of California, three-fourths of Texas and Oklahoma, all of Arkansas, Louisiana, Mississippi, Alabama, Georgia and South Carolina, one-half of Tennessee, a small portion of Kentucky, about seven-eighths of North Carolina, and one-half of Virginia.

In those days it was a tremendous undertaking to think of ever being able to eradicate the cattle tick completely from such a vast area. The officials knew the life history of the tick, but the only methods available for the complete eradication were to employ the use of pasture rotation, on large ranches dip the cattle in Beaumont oil, gather them up in a corral and give them a lick or two with a greasy rag, or, in cases where practicable, hand-pick them. In spite of these slow advances, it was evident that the work must be done. A great project had been started and there was no turning back, even if it was a long trail to follow.

In 1906 Farmer's Bulletin No. 261, with the late August Mayer of Shreveport, La., as its author, was issued by the United States Department of Agriculture. In this bulletin Mr. Mayer points out that the coming of the Mexican boll weevil would to a certain extent prove to be a powerful reformer, as it would turn the mind of the southern agriculturist to other lines. Naturally he would first consider the cattle industry, all of which would make him

eager and anxious to learn everything possible regarding the eradication of the cattle tick. Evidently Mr. Mayer had a very broad vision. He stated emphatically that he considered the presence of the tick the sole reason why the South was not a cattle country. It must be remembered that he was a resident cattle raiser in the heart of the tick territory, where the parasite continued to multiply until late in the fall and commenced operations early the following February. All cattle were heavily infested, with the exception of a very few purebred herds. The author speaks of a few men who undertook to immunize the cattle against Texas fever by the subcutaneous injection of blood from a tick-infested native animal, which did reduce the losses of imported nonimmune cattle to about 8 per cent, but he recognized it to be an inadequate measure, inasmuch as it did not offer the proper solution for the tick problem. His main idea appeared to be complete destruction of the cattle tick.

A few years later the Bureau of Animal Industry commenced to establish a few offices in the Southern States in coöperation with the live-stock sanitary boards for the purpose of gaining more information relative to the eradication of the tick. The appropriations were small, and public sentiment was at a low ebb. Moreover, there was very little, if any, State legislation which could be applied to the project. Therefore it remained for the inspectors to go out among the cattle owners and spread the gospel of tick eradication. Much pioneer work was done, and the inspector who has labored so faithfully since the commencement of the work up to the present time should be decorated with a medal of honor. He was combating against the resistance of centuries. Not only did the lower class of people think he was a splendid prospect for the insane asylum, but those who appeared to have good training and unbiased minds would often turn away in disgust whenever the subject of tick eradication was mentioned. Sometimes little meetings were called at country school houses, village stores, barbecues, and fairs, where the inspector with considerable tact and diplomacy might be able timidly to approach the subject. However, this opposition was quickly overcome, as in every community the inspector was able to find a leader who proved to be a key to the situation. If this leader was in favor of tick eradication, a formidable barrier had been broken down; but if he was against tick eradication, there was left only one enemy to fight.

The Bureau of Animal Industry recognized the fact that the project was a very difficult one, and in every instance was extremely

charitable toward the inspectors. Some men were not cut out for the work. They did not possess the qualifications. Nevertheless in other divisions of the Bureau they were regarded as highly efficient. Some of them were not fitted to engage in every phase of the project. Notably, some men were extremely well equipped to carry on an educational propaganda; others were fitted to direct the systematic end; and another class were able to step in and smooth over little difficulties and succeed in directing the work to the end that the last tick was destroyed.

Before dipping vats came into use the States of Tennessee and Kentucky and, I believe, California, succeeded in having most of their ticky area released from quarantine, and this feature of the work paved the way for the general construction of dipping vats for the use of arsenical solution, which has since proved so popular. It was interesting to note that when a county decided to carry on tick eradication the same spirit of progression would quickly radiate into adjacent counties. Therefore, when the work assumed large proportions in any one State, the effects were quickly felt in adjacent States. As time progressed, necessarily a considerable amount of money was expended and millions of cattle had lost their immunity. Consequently, the counties which had been released commenced to demand State protection and insisted that every county provide means for the complete eradication of the cattle tick. By this time a majority of the people had become thoroughly educated to the fact that tick eradication was a success and that it was an investment instead of an expenditure. The professional man, the merchant, the planter, and the average cattle owner suddenly woke up and saw wherein something drastic must be done in order to protect the cattle which had lost their immunity. A number of purebred herds had been established, and cattlemen were clamoring for better stock to improve the best class of native cattle. In the face of these conditions it is obvious why the various States took the matter in hand.

The first great commonwealth to pass a State-wide law was Mississippi, followed by Louisiana, Texas, Alabama and Georgia, and we must realize that before such a State-wide law could be passed the majority of public sentiment must be back of it, because, as we understand the average legislator, he would not listen to such a bill unless it had the indorsement of his constituents. From past experience we are of the opinion that the State-wide law governing the work of tick eradication is the only solution of the problem. It gives an equal distribution of funds, brings about a uniformity of

law, and, above all, adds a greater dignity to the work by recognizing it as compulsory on the statute books of the State.

At the present time much of the area that was originally quarantined has been released, and from present indications within five years the tick will be a matter of history. Some scientific institutions are commencing to collect samples of ticks to preserve for future study. Considering the great volume of opposition against the eradication of the tick, the southern people have given splendid coöperation. All arguments in opposition were born of ignorance. Therefore, if a man does not understand, it is natural for him to be skeptical. The circulation of Government and State bulletins helped to a large extent to break down the misunderstanding, and another agency which has contributed a large part toward the work has been the newspapers. They have been quick to recognize the advantages and have always been willing, as a rule, to publish anything that might clarify the subject. Their columns have been open, and if it had not been for their generosity I do not believe we would be so far advanced in the project as we are today.

Undoubtedly there is still more to learn about tick eradication, and every inspector in the field is anxious to perfect himself accordingly; but we do feel that the present methods are nearly perfect, and we would hesitate about making a drastic change. Up to December 1, 1918, 63 per cent of the territory originally quarantined had been released. This proves that the methods employed were satisfactory, and it shows that our appeal to the people was logical, or else no such large percentage could have been released from Federal quarantine.

Without fear of contradiction, permit me to say that the United States Bureau of Animal Industry, the various State live-stock sanitary boards, the parish and county governing officers, and the majority of the people have contributed their part toward tick eradication. Furthermore, in all the States where cases have been brought to the Supreme Court, the tribunal has always upheld the law—in other words, declared that it was constitutional and a public benefit.

As heretofore mentioned, the work has been a tremendous success, but in some counties where a considerable amount of money has been expended the proper results have not been obtained. In such cases we could analyze the situation and see wherein every body of officials had fulfilled all their obligations with the exception of the court officers. This places all the responsibility for the failure on the presiding judge, district attorney and sheriff. We

have featured this very strongly in Louisiana, and have discovered that the people strongly resent a tendency on the part of local courts not to enforce the law properly. If a judge is not doing his duty, the writer believes that we have the right to offer constructive criticism. In venturing such criticisms, we must show a due regard for the courts, and adhere strictly to the truth, basing our arguments on the fact that the law is on the statute books of the State, a great conservation measure and upheld by the Supreme Courts, and is intended to be enforced. Then the people can be shown wherein it will cost them thousands of dollars extra if the law-breaker is permitted to go free. Wherever I have had an opportunity to observe, the reaction has been all that we could desire. We do not preach persecution, but prosecution in cases where a man wilfully, intentionally and maliciously violates the law. The work must be uniform, and every one must cooperate to the finish in order to spend the minimum amount of money. If the law is not properly enforced, it creates a spirit of doubt in the minds of those who are willing to be governed accordingly. Therefore, you mix a few intentional violators with a number of doubters, and you have a conglomeration that will be soon beyond control of the courts.

Within the last few years tick eradication has been going full speed in all the Southern States, and during 1918 and 1919 the gains have been tremendous. In 1919 the number of square miles being worked totals 348,133. In the prosecution of this work this year the Bureau furnished 319 men, the States 533 men and the counties 1,850 men. The total approximate cost to the Bureau was \$655,078.04, to the States \$499,003.80, and to the counties \$2,428,901.15. The total approximate quantity of proprietary cattle dip that the various States have used this year is 250,196 gallons. Some of the States used the crude chemicals, and some of the counties in various States did likewise. The figures show that there were used 903,553 pounds of arsenic this year. The total number of cattle dippings in 1919, up to November 1, is 48,530,229. Some of these dippings include horses and mules, but we have a separate record for horses and mules, and the total number of such dippings up to November 1, this year, is 311,014. The number of vats in operation to produce these enormous figures is 35,534. Effective December 1, 1919, there will be available for release from quarantine in the Southern States 47,321 square miles, which will leave remaining under quarantine 220,426 square miles.

Previous to the writing of this article a letter was sent to the State Veterinarians in all the Southern States, requesting some informa-

tion along the lines of introduction of purebred stock and a few advantages due to tick eradication. Their answers should be looked upon as very dependable and suggestive of what can be accomplished if the live-stock industry is given further attention under the direction of a systematic organization. A report from nine of these states (figures for 1919) shows that approximately 19,170 purebred cattle or high-class grades for milk stock were brought into the South. In addition there were brought in 22,863 head of purebred cattle or high-class grades for beef stock. One State Veterinarian said there was no increase of cattle brought in over previous years; another estimated it at 25 per cent increase; another said 50 per cent increase; another said 500 per cent from 1908 to 1912, and 200 per cent from 1912 to the present time; another claimed that the number had doubled; another said 90 per cent; another 100 per cent, and another said it would be difficult to estimate; another said from 10 to 50 per cent increase in registered cattle and 20 to 40 per cent in the grades. Their average answers in regard to the increase in the intrinsic value of the cattle since tick eradication was inaugurated ran from 20 to 100 per cent, and in addition they believe that land values have increased from 25 to 100 per cent, all largely credited to the project of tick eradication.

The supposition now is that since the peace dove set out to find that olive branch, she must have got hold of a ripe olive.—Columbus (Ohio) *Record*.

Unless the printer made a mistake, automobile breeding is being practiced in Alabama, as indicated by the following advertisement in the *Tuscaloosa News*:

FOR SALE—Chevrolet, Sedan, first with
young calves. J. F. Conway, R. F. D. No. 1,
at 6 mile post on Greensboro Road.

The following news item from Tiffin, Ohio, which recently appeared in the *Toledo Blade*, records a novel contribution to the knowledge of natural history:

"A two-headed lamb was born Friday in the flock of Dr. A. C. Schafstall. Both heads were perfect; one was that of a male and the other a female. The lamb lived only a few hours. It is being mounted by a taxidermist."

BACCHARIS PTERONIOIDES AS A POISONOUS PLANT OF THE SOUTHWEST¹

By C. DWIGHT MARSH, A. B. CLAWSON and W. W. EGGLESTON,
Washington, D. C.

FOR some years reports have been sent in to the Bureau of Animal Industry of losses of live stock in the southern portions of Arizona and New Mexico, which apparently were produced by some plant in the forage, but for which no recognized poisonous plant could be assigned as the cause. Repeated botanical examinations of the region failed to solve the problem. Gradually, however, suspicion became directed to *Baccharis pteronioides*.

In 1910 Supervisor R. H. Selkirk of the Coronado Garces National Forest wrote that this plant, known locally as "yerba manza," was said to be poisonous to cattle.

In 1915 a letter was received from County Superintendent of Schools W. C. Miller, Prescott, Ariz., who sent a sample of weed which he was certain was killing cattle. The plant was identified as *B. pteronioides*. Mr. Miller was asked to describe the symptoms exhibited by the animals and replied as follows:

"First. The cattle walk just as a foundered horse, seem stiff and act as if they were sore footed.

"Second. They will lie down in a shady, moist place, and any attempt to move them will seemingly make them worse, and after driving them a short distance they will tremble in the legs and shoulders and the head will jerk, and they will want to move it to one side.

"Third. They will lie down or fall in a fit.

"Fourth. When opened, the intestines are as if they had been burned with potash.

"If they are removed from the weed before they are far advanced, they will recover, but if they refuse to eat other things they will die. They usually get to eating it during stormy weather, and it seems to take quite a lot of it to affect them seriously. Cattle nearly always die from it when feed is scarce on the range or in a pasture."

In 1913, through the Forest Service, a jar of stomach contents with a number of suspected plants was received. Among the plants were found *B. pteronioides* and *B. bigelovii*, but they could not be

¹ Published by permission of the Secretary of Agriculture.

identified with certainty in the stomach contents, although it was considered possible that the *Baccharis* might be the cause of the poisoning.

In the summer of 1918, while making a study of the flora of the Lincoln National Forest (New Mexico), Mr. Eggleston found *B. pteronioides* abundant in localities where fall and winter losses occurred, and thought there was good evidence that it had been extensively grazed. This cumulative evidence led to some experimental feedings at the Salina experiment station to determine definitely whether the plant was poisonous or not.

It may be stated, too, that there was more reason for suspecting this plant since several members of the genus growing in Mexico and South America have been used in medicine, and one, *B. coridifolia*, commonly known as "mio-mio" or "romerillo," is a well-known cattle-poisoning plant in Argentina, counting among its victims also horses and sheep. This plant has been extensively investigated, not only as to its effects in the field, but also in regard to its chemical and pharmacological properties.

EVIDENCE FROM EXPERIMENTS AND FIELD OBSERVATIONS

A number of feeding experiments were made upon sheep. These experiments definitely demonstrated the poisonous nature of the plant and showed that the lethal dose for that animal is not far from 1 pound. This means that while it is not an acutely toxic plant, it is one of a decidedly dangerous character. The symptoms exhibited were not distinctly characteristic.

While it is necessary to make further detailed experiments with sheep and also cattle, it is considered definitely proved that the plant is poisonous to sheep and probably has a similar effect on cattle.

Inasmuch as in many places in southern Arizona and New Mexico where cattle have died from some unknown cause it has been found that not only *Baccharis pteronioides* has been present but also has been rather heavily grazed, it seems highly probable, in the light of the preliminary experimental work, that the plant is the cause of the trouble.

In the Chiricahua Mountains, Arizona, the cattle range during the summer in the mountains above the *Baccharis* belt where forage is abundant. In October they are driven into the foothills at a time when forage is scarce, and deaths occur from that time to mid-winter. A number of localities were visited in the Lincoln National

Forest, where cattle had died and where the *Baccharis* had been eaten.

It is not considered positively proved that the *Baccharis* was the cause of the deaths in these two Forests, but the probabilities are so great as to convince the authors that there is little question of the cause of the losses.



Fig. 1.—*Baccharis pteronioides*: The female plant in blossom

DESCRIPTION OF THE PLANT

Baccharis pteronioides, D. C. (*B. ramulosa* [D. C.] Gray)

The plant shown in figures 1 and 2 is a spreading shrub from 1 to 2 feet in height, its width often exceeding its height. Its branches are usually biennial, the new canes appearing in mid-

summer after the flowering which occurs in April or May. The single taproot often throws out suckers. The branches are longitudinally grooved, scabrous and warty, but become nearly smooth with age. The tips of the young branches and leaves are sticky. The leaves are in dense clusters, small, from $\frac{1}{8}$ to $\frac{3}{4}$ inch long, lanceolate-spatulate to linear in form, veinless, punctate-dotted on both sides, thickish, and 2 to 6 toothed.



Fig. 2.—*Baccharis pteronioides*: The male plant in blossom.

The flowers are in bell-shaped heads $\frac{1}{4}$ inch broad, terminating densely leafy branchlets in a close racemelike manner. The flowers are of two sexes growing upon different shrubs. Figure 1 shows

the female flowers and figure 2 the male. The female flowers have a dusky white down about half an inch long.

The shrub grows in the foothills in gravelly or rocky soil of the slopes along the draws, preferring south slopes. Its known range of altitude is from 4,000 to 7,600 feet, but it is more commonly found between 5,000 and 6,000 feet, and it occurs from central Mexico through the Rocky Mountains of western Texas north to central New Mexico and eastern central Arizona.

PRACTICAL CONSIDERATIONS

As in the case of most other poisonous plants, it is probable that shortage of other forage is the main cause of animals grazing upon *Baccharis*. If the stockmen will learn to recognize the plant and note the localities where it is abundant, losses may be avoided by careful attention to their herds. It is especially important that half-fed animals should not be exposed to the temptation of eating the plant.

If, as now seems probable, *Baccharis pteronioides* proves to be an important poisonous plant, it is interesting to note that apparently its eradication will not be a difficult or expensive matter. It is local in its distribution and is easily destroyed, being commonly uprooted by two or three blows of a pick.

A detailed study of this plant is being carried on by the United States Department of Agriculture, and later a full report will be made.

AN APPEAL FROM AUSTRIAN VETERINARIANS

A letter addressed to the "Rectory of the College of Veterinary Surgeons in Philadelphia" has been received from the Association of the German Veterinary Surgeons in Salzburg stating that the veterinarians in that section of Austria are in great need and requesting assistance from American veterinarians. It is suggested that food drafts, which can be procured from any bank in the United States, be sent to the Association, Salzburg, Kaigasse 37, Austria, and proper distribution will be made of the foods purchased with them. There are thirty-one veterinarians in the district and the statement is made in the letter that they are willing to "repay when the value of our money again increases." L. K.

BETTER LIVE STOCK¹

By W. J. BUTLER, *State Veterinarian, Helena, Mont.*

BETTER live stock means not only animals of better blood lines, but animals of stronger vitality, freer from disease and more capable of adapting themselves to climatic and feeding conditions. In the past we have been prone to consider the words "better live stock" as applying only to better blood lines. From an economic standpoint it is just as essential that animals be freer from diseases, have more vitality and be more capable of adapting themselves to feeding and climatic conditions of the country in which they are being raised as it is for them to be bred along better blood lines. Pick your sires from herds bred along these lines and not bred for the show ring. If we desire to make a financial success of stock raising, the scrub animal must go.

The necessity of good cattle was clearly demonstrated a few years ago when eastern dogies were shipped into Montana. It is true that some speculators made money on these animals, but I have yet to meet the legitimate stock man who made a profit on running eastern dogies in this State. Eastern dogies are not properly bred. They can not stand our climatic conditions, neither can they properly digest and assimilate our roughage feed. They are not the proper cattle for Montana. They do not have the rugged vitality of a range animal. Their hide is thin; they can not stand cold weather. They do not have sufficient vitality to digest and assimilate their food and at the same time maintain body heat.

The normal temperature of a cow is 101° F. This temperature must be maintained at all times and under all conditions. If it falls below normal, digestion and assimilation stop, pathologic changes take place and death may result. When our winter temperature is 20 degrees below zero, the difference between the temperature on the outside of an animal's skin and on the inside of that animal's skin is 121° F. You will therefore realize the absolute necessity of an animal being provided with a thick hide, well protected with hair, and possessing a rugged constitution so it may digest and assimilate its food.

I desire to impress upon you the absolute necessity of purchasing and raising cattle that are bred along well established blood lines and at the same time are rugged and sound.

¹ Paper presented at the thirty-fifth annual meeting of the Montana Stock Growers' Association, Billings, Mont.

Montana is a range country. It is a short-grass country in the northern part of the temperate zone. Therefore it should not be considered a breeding country. It is better adapted for running steers. That does not mean that we must not breed cows. We must maintain a certain number of breeding cattle. The number of breeding cows, however, which we maintain must be absolutely limited by the means we have at hand to feed and care for them properly, both before and after calving. With our changed conditions it is a prime necessity to feed a breeding cow concentrates, such as cottonseed cake, copra or corn, with a sufficient quantity of hay. It is equally essential to feed calves.

It has been the dream of those advocating ploughing our natural range country to have small farms on every section in the State. They say each one of these farms will grow, feed and raise live stock. I wish I had their optimism; but never as long as you or I live will they profitably grow feed and raise live stock year in and year out on small dry-land farms in this State under existing conditions and with our present knowledge of farming. There are wonderful farming sections in Montana, but they are not in what we know as our arid or semi-arid short-grass range country.

Nature grows short grass for a distinct and definite purpose. It is that it may cure naturally on the stem and retain all of its proteids, carbohydrates and vitamins in order that live stock may live and thrive on it the entire year round. In this way nature has provided a grass-balanced ration for range live stock. Vitamins are complex organic substances occurring in small quantities in many feeds, upon which health and life itself depend. The lack of vitamins in the human produces such diseases as scurvy and beriberi. Vitamins are the substances which stimulate the growth and development of an animal. Green grass and short grass contain an abundance of vitamins. That is one reason why that kind of grass is such a wonderful food and why such exceptionally developed and finished animals have been produced on the open range.

Immatured hay contains more vitamins than natural hay. Likewise hay grown and cured in an arid or semi-arid country contains and retains more water-soluble vitamins than that grown and cured in a humid country. That is the principal reason why Montana hay is superior to eastern hay. Unfortunately hay which is cured after it is cut does not permanently retain its vitamins. The older it grows the more vitamins it loses and the less nourishing and less of a balanced ration it becomes. Matured hay supplies

the carbohydrates and the bulk so necessary for body heat, but if fed over an extended period of time it must be fed in conjunction with some other feed containing proteids and vitamins and laxative qualities, such as cottonseed cake, copra, corn, or possibly immature hay or ensilage. For extended winter feeding, if it is impossible to ship in and feed concentrate I recommend that you secure one cutting of immature hay to feed with your matured hay. It is not to be understood by this statement that immature hay cut and stacked is a balanced ration, or is superior or even equal to concentrates such as cottonseed cake, copra or corn. It is not a balanced ration. Neither is it the equal of concentrates. Immature hay recommended is not grass cut in the wet, undeveloped, green stage, but hay cut just previous to its becoming matured. May this not be one of the main factors why sections like the Big Hole country in Montana or North Park in Colorado produce such wonderful hay-fed cattle? Their growing season is oftentimes too short to thoroughly ripen and mature hay. However, feeding experiments alone will determine the definite value of immature hay when fed in conjunction with matured hay, and the proper time at which it should be cut and stacked.

A strictly matured hay diet is not a balanced ration, and if fed over a considerable period of time will result in digestive disturbances which will cause autointoxication and possibly terminate in the death of the animal. The symptoms in such cases are stiffness, oftentimes associated with stringhalt, staggering gait, falling to the ground, rolling of the eyes, paralysis, generally in the hind legs and quarters, and in some cases convulsions may be present. The appetite and excretions of the animal apparently may be normal. The period of attack varies from one to three hours to a day. Recovery or death depends upon severity of attack and quality and kind of feed available. Recovery from first attack in many cases is followed by a second attack in from 7 to 14 days.

We have had many such cases this past winter. This condition was not always confined to the weak animals; in fact, in many instances it was apparently the strongest animals in the herd that were affected. This led to the belief on the part of many owners that their animals were affected with an infectious contagious disease. In not one instance where the symptoms which I have described were present did we find an infectious contagious disease. In each and every case we determined that the primary cause of the condition was due to a feeding deficiency or an unbalanced ration.

It may sound paradoxical, but in a short-grass country, where

there is natural protection and the range is not overstocked, it is more humane to run animals on the open range than it is to confine them in a small pasture or barnyard and feed them a strictly matured hay diet over an extended period of time.

In addition to vitamins so essential to life and development, growing animals require a certain amount of exercise, thus the desirability of an open range or a large pasture. Animals also require a good water supply. If an open spring or an artesian well is not available it will pay 100 cents on the dollar to build water tanks and put in tank heaters.

The more you confine animals the more diseases and trouble you may expect, and the more expensive will be their production.

Montana is fundamentally a range or a large-pasture country. It is not a country for dogie cattle confined in a barnyard. A realization of these facts, together with a realization of the necessity of feeding food possessing laxative qualities and containing vitamins and proteids, along with our matured hay, will tend to develop better live stock and to make the live-stock industry more staple and profitable.

FIFTY-SEVENTH ANNUAL MEETING

AMERICAN VETERINARY MEDICAL ASSOCIATION

COLUMBUS, OHIO, AUGUST 23-27, 1920

Our Aim: 2,000 members, 1,000 non-members. Bring the ladies.

General Sessions. Section on General Practice. Section on Sanitary Science and Police.

President Cary and Secretary Mayo are planning to make this a meeting of unusual interest and benefit to the practitioner.

Make your hotel reservations early. See particulars in the June JOURNAL, page 333. The Committee on Local Arrangements will be glad to give further information. Address the Chairman, Dr. F. A. Lambert, 1996 Summit Street, or the President of the Ohio Veterinary Medical Association, Dr. O. V. Brumley, Ohio State University, Columbus, Ohio.

TUBERCULOSIS ERADICATION: ITS AIMS, METHODS AND ULTIMATE GOAL¹

By JOHN A. KIERNAN, *Washington, D. C.*

IN the brief space of time allotted to this subject I shall endeavor to develop only a few of the salient phases of the tuberculosis eradication campaign. It shall be my endeavor at some future time to take up other features of the subject and elaborate on them sufficiently to outline in general a comprehensive plan of putting this great crusade against tuberculosis of live stock in operation on a Nation-wide basis.

The three topics to be discussed at this time are: (1) The personnel of the forces engaged in the campaign; (2) the accredited-herd plan; (3) infected areas versus free area.

When tuberculosis eradication work was taken up on a coöperative basis, in May, 1917, there were employed by the Federal Government approximately ten veterinary inspectors who were devoting their entire time to this work. Their efforts were confined to a territory in or about the Nation's capital. From time to time employees were detailed from various field stations to apply tuberculin tests to herds whose owners were particularly interested in the subject, but these herds in the aggregate numbered probably less than 100. In many States, however, comparatively large forces of State employees, numbering from 3 to 10 veterinarians, were engaged in combating the disease.

I desire to commend most highly the foresight and determination of the State veterinarians of those States for the splendid work they accomplished. From the very earliest period of which we have record of the organization of veterinary forces throughout the United States, we observed that leaders in many commonwealths had made plans for controlling and exterminating tuberculosis of animals. It would be a gross injustice to our contemporaries not to give just credit for the inspiring and lofty plans conceived and put into execution by such shining lights of the veterinary profession as Pearson of Pennsylvania, Ward of Minnesota, Dyson of Illinois, and many others. To their imperishable records I humbly pay obeisance. To the lamented Melvin I also bow in reverence, to his broad-visioned conception of the idea to launch this campaign before tuberculosis had gained the master hand over the animal industry of America.

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

With but one more well-deserved word of commendation, I shall proceed to discuss the features of the work mentioned; but I trust that this humble effort to place in proper juxtaposition a few eminent names will have its place in the archives of veterinary medicine in America for just this one purpose—to give credit to those to whom credit belongs for this work which promises to be an epoch-making event in the annals of live-stock sanitary work throughout the world. To a former Member of Congress, Hon. Charles H. Sloan, the Nation is indebted for his untiring interest and his great perception of the necessity of protecting the live-stock industry of America from the ravages of disease. It was he who introduced the first bill in Congress to appropriate funds to be used in the control of hog cholera. After guiding this work through the perilous paths of our legislative halls he turned to lend his able support to the next great problem he believed should be solved, and he introduced in Congress a bill to provide the Department of Agriculture with \$1,000,000 for the control and eradication of tuberculosis of live stock. He is no longer a Member of Congress, but the deeds he did will long remain to his credit and will be regarded as masterpieces of statesmanship.

THE PERSONNEL OF THE FORCES ENGAGED IN THE CAMPAIGN

In reviewing the live-stock laws and the rules and regulations of the respective States we observe that for more than ten years practically every commonwealth required that before cattle could be introduced from other States for breeding and dairy purposes they should be free from tuberculosis as determined by the tuberculin test and physical examination. It would seem that by such a restriction it would be well-nigh impossible for that disease to spread from one State into another. It would seem that such a provision would be a barrier that could in no way be hurdled or passed over. It sounds ideal, and it would have terminated with ideal results had every element entering into it observed its tenets. Alas! the purposes for which such laws and regulations were designed were not altogether accomplished, and I may say that they were very far from being accomplished. The live-stock industry knows that they were not accomplished, the live-stock sanitary officials know that they were not accomplished, and the very records that rise up like the ghost of Banquo bear testimony to the fact that they were not successful. The protests, the charges, the recriminations that were made by State against State, by man against man, bear testimony to the fact that the ideals proposed in such laws were not realized. The shipments

of tuberculous cattle on certificates issued in various parts of the United States alleging them to have been tested and found free from the disease are notorious; then, the less they are discussed the better.

The bare regulation requiring a tuberculin test of cattle for interstate movement was found inadequate in many instances, and a number of the States inaugurated additional restrictions to safeguard their cattle industry. Some States quarantined absolutely against other States, and again regulations were issued that tuberculin tests should be made only by certain specific persons or organizations.

The outcome of these many regulations created a very strong resentment on the part of the live-stock owners, many of whom were largely responsible for the approaching chaotic condition. Many of the States now require a retest upon all cattle introduced from other States for dairy and breeding purposes. This plan—while we must admit that it works a considerable hardship upon the purchaser of cattle—has proved to be one of the greatest stimulants for the eradication of tuberculosis that has been developed. Of primary importance in the eradication of tuberculosis was the checking of the movement of diseased animals from State to State. Manifestly, it would have been of little use to undertake to clean up an area if diseased animals were permitted to be introduced into that section. I do not undertake to maintain that the interstate movement of diseased animals is entirely prevented at this time; but it is a fact that a very large percentage of tuberculous animals that heretofore were moved interstate are now denied movement interstate, and they are not being shipped East and West and North and South as they were a few years ago. The live-stock owner realizes now more than ever that the prospective purchaser of cattle can not be humbugged: he is seeking animals to augment his herd *from herds whose health is known*.

At this time there are in the neighborhood of 400 State and Federal employes engaged full time in the eradication of tuberculosis. To these veterinarians, many of whom, if not all, are members of this Association, much credit is justly due. They who are engaged in the field work, actually test the cattle, come in contact with the owners and managers of herds and their families, are duty bound to perform tasks that are not always entirely pleasant, and unfortunately in many instances are obliged to render this public service for a compensation at a prewar rate or at a compensation far too small. An abundance of proof that these veterinarians have done their work in a very creditable manner has reached the Bureau

of Animal Industry, and this Association can feel gratified that the veterinarians engaged in public work on tuberculosis eradication have conducted, and will continue to conduct, their work in such a thorough and able manner. These forces are being gradually increased from month to month, and it is not without the realm of reason to anticipate that within a few years there will be more than a thousand employees devoting their entire time to the control of this great plague.

Can satisfactory progress be made with such combatant army of veterinarians? I say, most decisively, "No." We can clean up hundreds of herds in every State; we can clean up tens of counties throughout the United States; but there are tens of thousands of herds to be cleaned up and thousands of counties to be freed of tuberculosis before we can lay any claim to the grand title of the subject of this paper. Our forces now are and most necessarily would always be absolutely inadequate under the present plan of operation; that is, the employment only of official veterinarians in this work.

But does the present plan represent *all* the ideas and conceptions of the necessity for conducting this campaign? It does not. It was never contemplated that satisfactory progress could be made in the eradication of tuberculosis by the employment of only State and Federal officials whose entire time was devoted to the work of the respective Governments by which they are employed. The scope of this work—its proportions—were duly recognized at the time the work was launched. Those in charge of the work recognized from the first the tremendous task undertaken, and they well understood that if satisfactory progress was to be made every available competent person in the United States who could lend assistance to the campaign must necessarily be enlisted as a coöperating force so that satisfactory progress might be made.

You have heard, perhaps, as we all have heard, that this tuberculosis eradication work was "depriving some veterinarians of their bread and butter." In my mind there is a serious doubt whether I should speak such a phrase; and to a discreet mind, when doubt arises, the subject of the doubt should be dismissed and not uttered. But this claim has been oft repeated, less often by practicing veterinarians than by would-be conservators of the perquisites of the private veterinarians—those intense, philanthropic individuals who are eternally vigilant to protect others from the wrath and inquisitions of an omnipresent evil; those valiant crusaders who with true

chivalric spirit are searching everlastingly as Don Quixote was for opportunities to demonstrate their altruistic and indomitable courage and determination to right imaginary wrongs.

No State has any license or desire to do the private veterinarian an injury, and far be it from the thought of the officials of the Bureau of Animal Industry to work any hardship upon them. The Bureau believes that the campaign for tuberculosis eradication that is now in progress will do more to improve the practice of the private veterinarians of the United States than any other work ever inaugurated, with the possible exception of the control of hog cholera. The private veterinarian must and will play a very important part in this campaign, and it was intended from the very beginning of the work that in time he should be brought into active cooperation. As a true and substantial manifestation of the conception the Bureau has had of the part to be played by the private veterinarian, you are referred to the article on tuberculosis eradication read by the speaker at the meeting of the United States Live Stock Sanitary Association held in Chicago in December, 1918. A plan was then outlined for turning over to the private veterinarian accredited herds which had officially been found free of tuberculosis. This plan will be discussed at greater length at the coming meeting of the above-mentioned association and concrete suggestions made for linking up the private veterinarians with the accredited herds of the United States.

Regulation 7, the first Bureau regulation requiring the application of the tuberculin test for cattle shipped interstate, provides that practically all the testing shall be done by private veterinarians who have demonstrated that they are capable of making tests, and at this time upward of 6,000 private veterinarians are upon the list and have been furnished certificates by the Bureau to test cattle with tuberculin under that regulation. Where in all the annals of veterinary medicine has a more extensive, a more comprehensive and a more practical demonstration of the desire of enlisting the private veterinarians to supplement the work of official veterinary organizations charged with the responsibility of controlling and eradicating infectious diseases ever been consummated? The Bureau has endeavored in that way to enlist the services of every qualified veterinarian in America in the campaign of tuberculosis eradication. It was not a secondary thought that produced this existing plan. It was conceived at the outset and carried into execution at the most propitious moment.

Some few people have conceived the idea that the State veterinarians and the Bureau work a gross injustice upon them when in the accredited-herd plan they provided that tests should be made only by official employees. The error in so construing the preparation of that plan is that anybody designedly left out the private veterinarian. The accredited-herd plan is the outgrowth of a joint committee representing the purebred cattle associations of America and the United States Live Stock Sanitary Association. This committee was made up of ten members, five representing the purebred cattle club breeders and five representing the association. They met and discussed the plan and submitted a report which was adopted by the sanitary association.

Provision 1 of the plan states that a tuberculosis-free accredited herd is one which is tuberculin tested by the subcutaneous method or any other test approved by the Bureau of Animal Industry under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of a State in which coöperative tuberculosis-eradication work is conducted jointly by the United States Department of Agriculture and the State. This paragraph was unanimously adopted both by the joint committee and the sanitary association. In my judgment it is a wise provision. I do not think that there would be any way to destroy and cast into ignominious oblivion the accredited-herd plan in any quicker way than to permit herds to become accredited upon a test made by every individual, private practicing veterinarian in the United States—and no veterinarian has any keener sense of the honor and integrity of the profession as a whole than the speaker. I make no apologies for the sentiment expressed, and accept no second position in striving to cast honor upon the profession of which I feel myself one of the most humble members.

To place the accredited-herd plan on the basis of a test by every veterinarian would be putting it in the same position as the interstate movement of cattle has been for ten years. Immediately there would spring up in practically every State the skepticism that has existed for years as to the reliability of the test—and where would the accredited herds be, if in one State there were a hundred herds upon the list that were absolutely ignored in ten other States? If State A had 100 herds and State B had 100 prospective purchasers of purebred cattle, but State B had no confidence in the reliability of the accredited herds in State A, what would it avail that State to have an accredited-herd list? Would it not be absolutely upon

the same basis as the interstate movement of cattle has been for ten years? And would not these various States say, "We do not accept accredited herds from State A or State D or State L? We do accept accredited herds from State C and State K under certain conditions and restrictions and interpretations. They may come into the State, provided we retest them in 60 days." Would that be an accredited-herd plan that you would be proud of, or that any State would take interest in, or any legislature appropriate money to maintain, or any breeder—any reliable and responsible breeder—take any pride in being a member of?

In contrast to that condition, which I think would exist if herds were accredited on the same basis as cattle were tested for interstate shipment for many years, is our accredited-herd system today containing more than 1,000 herds and representing many thousands of cattle. After having the official approval of the United States Department of Agriculture and of every sovereign State in America an accredited herd may move from one State into another State now at any time the owner desires to move it or any member of it, without any additional tuberculin test. Furthermore, a member of an accredited herd or the entire herd itself may move from any State in the United States into the Dominion of Canada or the Argentine Republic or the Republic of Chile, and I dare say to every country in the world that will accept our cattle, without any additional tuberculin test. These herds are tested annually, and those that are accredited receive a certificate from the State and the United States Department of Agriculture which the owner may use to tell the world that, so far as human ingenuity and the best biological agencies that have ever been found can detect the presence of tuberculosis, his herd is free of that disease.

Is there a person within the hearing of my voice that can find any reasonable complaint with a plan that can pick out of a chaotic condition the cattle industry of America and, within a period of two years, place it upon a pedestal that can withstand the darts of criticism? Can any person reasonably object to the accredited-herd plan that the live-stock owners of America have indorsed and that practically every purebred association in America has gone on record by instructing and urging its members to place their herds on such list at the earliest possible date? It is a matter of great pride that the speaker is so fortunate as to be linked up with a work that has so much worth behind it that the breeders of America claim it as the greatest step ever undertaken in the control of tuberculosis.

Shall the private veterinarian take a part in accredited-herd listing? Yes; he shall take a part equal to any person now engaged in that work, provided he demonstrates that he is capable of doing the work, provided he demonstrates that he does the work the same as those engaged in it, and provided he does it in a businesslike way at the time it is intended that it shall be done. We have some ideas relative to the part he shall play in this campaign, but inasmuch as this subject is going to be discussed thoroughly at the meeting of the United States Live Stock Sanitary Association which will be attended by many of you, I will not undertake to enlarge upon it at this time. Suffice it to say, however, that so far as the Bureau of Animal Industry is concerned it will strive for the adoption of a plan which will enlist the services of the private veterinarians in a way that will be satisfactory to all concerned and at the same time will safeguard the plan from as many errors as possible.

The live-stock world cares little whether tuberculosis is eradicated by private veterinarians or officials of the States and Federal Government, but it is concerned in the conservation of its resources and it does not propose to permit tuberculosis to spread until practically all the herds, bovine and porcine, are infected. It has called the halt on the great white plague so far as it affects the cattle and swine. It says, we believe, that when tuberculosis has advanced at the rate of 1 per cent per annum among the swine of America for the last 10 years, with prospects that it will continue to spread at an increasing rate unless checked, we should be traitors to the nation if we did not make every endeavor to check the ravages of the disease at this time. It further says to the State live-stock sanitary officials and to the United States Department of Agriculture: "Your organizations are charged with the responsibility for the control and eradication of infectious diseases of live stock, and we hold you accountable for the progress that tuberculosis has made and the prospects of its further advancement. The burden is upon your organizations to check its spread, and we, with our organization, and through our individual efforts, are going to hold you strictly to account. If tuberculosis is an eradicable disease, you must eradicate it!"

It strikes me that if we don't eradicate it, someone else will get the job; through some other organizations, State and Federal, an effort will be made to exterminate tuberculosis. We have a tolerant people in this nation—easy-going, good-natured, willing to overlook mistakes, sympathetic and tolerant—but all these virtues have a limitation, and this same people when they make their minds up to do a

thing never fail! They have made up their minds to eradicate tuberculosis, and they have given us the great privilege which the veterinary profession of America deserves to be entrusted with because it has demonstrated on every occasion that has arisen that it can be relied upon to fulfill its mission—it has, by its deeds, won the everlasting respect of the live-stock industry, its employer; and what greater compensation and honor could it obtain than the commendation, “Well done, thou good and faithful servant”?

THE ACCREDITED-HERD PLAN

The accredited-herd plan was unanimously adopted by the United States Live Stock Sanitary Association and by representatives of the purebred cattle-breeders' associations, and approved December 23, 1917, by the United States Bureau of Animal Industry. Today it is less than 2 years old. It is adopted by every State and Territory of this nation. It is in operation in 45 States. The demands for the work far exceed the forces available to take care of it. In August, 1918, List No. 1 of accredited herds was printed by the Department of Agriculture and 50,000 copies were distributed throughout the United States. On March 31, 1919, the books were closed so that List No. 2 would contain all the herds accredited up to that date. List No. 2, of which 100,000 copies were printed and have been distributed, shows that then there were 782 accredited herds and 6,535 herds which had passed one successful tuberculin test without reactors in preparation for certification. Since that date these figures have been largely augmented.

The accredited-herd plan has been indorsed by every purebred cattle breeding association in the United States and has been approved by practically every agricultural and live-stock journal of America. The plan is not perfect, but it is reliable. It has withstood the test of time, and to day it stands approved. That it can be improved here and there, there is no gainsaying; but the plan, if followed, will be the beacon light to guide the cattle industry of America in the eradication of tuberculosis. From time to time accredited herds will be found to contain tuberculous animals, and some owners will be disappointed and may question its success, as some individuals question the skill of the surgeon, or the observations of the astronomer, or the reckoning of the mariner, or the astuteness of the statesman, or the ability of the lawyer, or the diagnosis of the physician, or the wisdom of the philosopher, or the accuracy of the scientist. The accredited-herd plan will make errors

the same as flesh and blood and every plan devised by man. As the seed fails to germinate and the soil fails to function, and the tides overreach their normal ebb and flow, so will the accredited-herd plan fail to reach the acme of perfection; but if we veterinarians fulfill all our obligations, if we render to the accredited-herd plan and to the industry, with the health of which we are charged and have sworn to protect, the best services which we are capable of rendering, the accredited-herd plan will have so few errors charged against it that it will take its place among the human instruments devised by man for the perfection of man's worldly goods.

If we cooperate with the same earnestness that the veterinary profession has cooperated in the extermination of other infectious diseases of the United States, the accredited-herd plan will have done more to raise the veterinary profession in the estimation of the live-stock world and in the estimation of this nation and the nations of the world than any work it has ever undertaken. American veterinarians have assumed a great responsibility in undertaking to eradicate tuberculosis. They do it, not with the idea that it is an easy task, but that it is the most gigantic work ever assumed by them. Their aim is to eradicate tuberculosis from every purebred herd in America so that it may be on the accredited-herd list.

In twenty years from now what will be the status of a herd that is not accredited? Will it be necessary to have a discredited-herd list? The accredited-herd plan is worthy of the support of the individual veterinarian, of the county association, of the State veterinary association, and of the greatest veterinary association of the world—The American Veterinary Medical Association.

GUIDANCE OF A. V. M. A. IN TUBERCULOSIS ERADICATION CAMPAIGN

This association at the annual meeting in Chicago, 1909, appointed the commission known as the International Commission on the Control of Bovine Tuberculosis, the personnel of which was as follows:

Dr. J. G. Rutherford, Ottawa, Canada, Chairman.

Dr. M. H. Reynolds, St. Paul, Minn., Secretary.

Senator W. C. Edwards, Ottawa, Canada.

Mr. J. J. Ferguson, Chicago, Ill.

Mr. J. W. Flavelle, Toronto, Canada.

Hon. W. D. Hoard, Fort Atkinson, Wis.

Dr. C. A. Hodgetts, Toronto, Canada.

Dr. J. N. Hurty, Indianapolis, Ind.

Dr. J. R. Mohler, Washington, D. C.

Dr. V. A. Moore, Ithaca, N. Y.

Dr. M. P. Ravenel, Madison, Wis.

Dr. E. C. Schroeder, Washington, D. C.

Mr. T. W. Tomlinson, Denver, Colo.

Dr. F. Torrance, Winnipeg, Canada.

This commission held four meetings—at Buffalo, N. Y., December 13 and 14, 1909; Detroit, Mich., March 1 and 2, 1910; Ottawa, Canada, May 19, 20 and 21, 1910; Madison, Wis., June 27 and 28, 1910. An exhaustive study was made of the tuberculosis problem at that time, and in a report submitted by the commission at the conclusion of its investigation all of the phases of the work were succinctly covered, and a study of this report can not help but inspire one engaged in the work at this time.

INFECTED AREA VERSUS FREE AREA

When an area is freed of tuberculosis how shall we protect it against the invasion of diseased animals?

It must be admitted that, if an area is freed of tuberculosis, it would avail very little to the residents of that area unless some means were devised for preventing the introduction of tuberculous animals. If a county such as Island County in the State of Washington, or the District of Columbia, wherein our Capitol is located, eradicates tuberculosis from its cattle, is it asking too much to put such territory in a little different status from counties or States wherein it is known that the disease exists to a considerable degree? If the State of Idaho or any other State is freed of bovine tuberculosis, should it be kept in the same status as another State wherein tuberculosis exists among 30 per cent of the cattle?

Today we have a Federal regulation requiring the tuberculin testing of cattle for interstate shipment. Would it be justice to the live-stock owners of a tuberculosis-free Idaho, to the live-stock owners of Island County, Washington, or to the live-stock owners of the District of Columbia, to require that their cattle shall be tuberculin tested before their cattle will be allowed to move interstate, when no tuberculosis exists within their confines? It is true that those territories—the county, the State and the District referred to—are comparatively small units; but there are other States representing more than one-half of the area of this country that are comparatively free from tuberculosis, and it is reasonable to expect that within the next 10 years those States will be practically freed from the disease. Should we not be looking forward to the time

when this area should be classed as free, so that the movement of cattle interstate might be facilitated without any tuberculin test? The State of Georgia now proposes to eradicate what little tuberculosis exists in the three northwestern counties of the State. What will it profit the owners of those three counties after they come through with the work and have exterminated the disease, if they are required to have their cattle tested the same as cattle tested in States wherein the disease exists extensively? Starting at the Potomac River, going south to the Gulf of Mexico, and west to the California line, and going west from the Washington Monument, all that territory south of the Ohio River is comparatively free from tuberculosis. In addition to that, take the States of Oregon, Washington, Utah, Idaho, Montana, North Dakota, Wyoming, and Nevada, and possibly some that are not mentioned; they are comparatively free from tuberculosis.

In all that territory and within all the States enumerated tuberculosis exists among the dairy herds recently established or herds of longer standing that were established with the seed foundation imported from other States. That is a very serious charge—that those States were free from tuberculosis until animals were imported into them from other States! The grounds upon which that statement is predicated are the experience of tuberculin testing all of the herds in that territory for a period of two years and the more extensive testing of herds in those respective States under the supervision of the State veterinarians. You can go into the native herds where no importations have been made and where the animals have not come into contact with herds containing recent importations, and no tuberculosis is found. Can any person question for one moment the right and duty of a State official having such conditions to employ every possible restriction and regulation to keep the disease out of his State? Why, he has the unanimous support of the live-stock industry and he has the resources, the entire resources, of his State—physical and financial—to back him up in freeing the territory of the disease! What is his reward and the reward of the people going to be when they do get rid of the disease? Shall they be required, whenever they desire to ship an animal interstate, to have it tuberculin tested the same as other States where the disease has obtained a stronghold? Would it not be sufficient for those herds to be annually tested or occasionally tested?—and it will be necessary to test them to be certain that the disease does not exist.

I submit to you the recommendation that as rapidly as territory is freed of tuberculosis it be designated as free territory, and that the movement of cattle from that territory interstate, except cattle under local quarantine, be permitted without restrictions so far as tuberculosis is concerned. In ten years we should have in the United States an area approaching more than 2,000,000 square miles that will be virtually free of the disease. This will represent, in round numbers, two-thirds of the total area of the United States. This may seem visionary to some, but it is not any more speculative than was the program outlined in 1906 for the eradication of splenic fever of cattle. You will recall that at that time there was quarantined on account of the existence of the cattle tick more than 700,000 square miles of territory in this country. The plans in operation for the eradication of the tick when the work was inaugurated were the rotation of pastures and the mopping of infested cattle with the grease rag. Both methods were later supplanted by a more modern and approved method, namely, the dipping vat, which is now in universal use in the extermination of that disease. The point I wish to make, however, is that in 1906 it was known that the cattle tick could be eradicated, and the Bureau of Animal Industry proclaimed that it was engaged in a campaign to exterminate that parasite from more than 700,000 square miles of territory within the Union. The end of that campaign is in sight, as it is contemplated that the work will be practically completed well within five years from this date.

I grant that it is very much easier to exterminate the tick from an infested area than to eradicate tuberculosis from a herd; but we have knowledge and confidence born of experience that the latter disease can be exterminated from a herd; and that hundreds of herds have been freed of tuberculosis. Accepting those facts, as we are compelled to, we have confidence that wherever and whenever an owner and the manager and other persons in care of a tuberculous herd earnestly determine to rid it of the disease and put into practice the same methods that have been tried and proved adequate, they will eventually succeed. It will be a difficult task, but the effort will be crowned by victory when it is determinedly practiced.

The responsibility for eradicating tuberculosis from individual herds rests upon the owners and persons in care of such herds. If they approach the problem without decision, without determination, and without carrying out all the practices that are absolutely essen-

tial for success, they will fail. If they leave in the herds tuberculous animals that are compromises of their own consciences, if they trifle with the results of the tuberculin test or any other reliable method of detecting the disease, they will fail. In every State today owners may obtain full instructions for eradicating tuberculosis.

The campaign is just in its infancy. No person can forecast the date when this great work will be completed, and it is unnecessary to make any estimate of how long it will take. It may be 50 years or a century before the end is in sight; but what is a century if, at the end of that brief space of time as compared with the ages that have passed and the time that is to come, the job is finished? If we pursue this campaign and it develops as it has progressed in the last two years—and we are working hand in hand, breeder with breeder, and veterinarian with veterinarian—there need be no apprehension as to the ultimate outcome, and as this generation relinquishes its responsibilities and they are assumed by their successors we need have no qualms of conscience as to the estimate they will have of our ability and sincerity and temerity to have engaged in this enterprise; and what richer heritage can we bestow upon our successors than the preservation of the live-stock of this Nation which has been entrusted into the care of the breeders and the veterinarians during their reign upon this earth! Therefore, let us strive to be true to ourselves and show by our deeds that we were worthy of the trust reposed in us!

Dr. R. W. Hickman, while sitting in the tenth decennial meeting of the United States Pharmacopœial Convention, noted as interesting coincidences that this is likewise the year of the one-hundredth session of the Philadelphia College of Pharmacy, of which he is an alumnus, and that the class with which he graduated, that of 1870-71, was the semi-centennial class of that institution. *Sic tempus fugit.*

Dr. Charles L. Colton, Deputy Commissioner of Agriculture of Connecticut, was a recent visitor to Washington in the interest of animal-disease control in his State.

STUDIES ON ANTHELMINTICS. IX—SANTONIN

By MAURICE C. HALL,

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Detroit, Mich.*

IN previous publications the writer has pointed out that since santonin differs from the great majority of anthelmintics in that it is not a gastro-intestinal irritant, it is especially qualified for use where repeated doses of an anthelmintic are indicated. Moreover, in the amounts in which santonin is commonly employed, repeated doses are much more effective than single doses, even where the latter exceed the limits of the commonly used therapeutic dose. Of the worms in the dog, hookworms and whipworms are the ones which commonly require repeated doses for their removal. Of these, the hookworms are not amenable to treatment with santonin, a fact which is generally known and which the writer has confirmed experimentally. Whipworms, however, can be removed by santonin, and in the writer's opinion santonin finds its especial indication in the treatment of whipworm infestations. In an earlier paper (Hall, 1917) the writer has stated the case thus:

"To secure results from santonin it is necessary to repeat the dose a number of times. It may be given [for ascarids], 1 grain of santonin and 1 grain of calomel a day, as often as necessary, having due regard for its effect on the patient, and especially on the kidneys, and in some instances this method might be preferred to the administration of a single dose of oil of chenopodium, but for certainty of results and saving of time, chenopodium is the preferred treatment. The treatment just outlined, 1 grain of santonin and calomel daily over long periods, is a very effective treatment for the removal of whipworms, as only an occasional dose of anthelmintic enters the cecum, where these worms are lodged, and treatment must be repeated to insure removal of these worms. Santonin is of no value against hookworms, even in oft-repeated doses."

The following experiments in administering santonin to dogs illustrate the points just mentioned.

In single dose:

Dog No. 178, weighing 7.75 kilos (17 pounds), was given santonin at the rate of half a grain per pound of live weight, or 8.5 grains. This is the dose rate used by some veterinarians and is

¹ Resigned March 27, 1919.

very much higher than that given by Winslow (1 to 3 grains). The dog received an equal amount of calomel. This dog passed either 57 or 20 ascarids, probably 20 (the feces of this dog and another were confused when both animals escaped from their cages). On postmortem examination this animal had 12 ascarids and 1 *Dipylidium*. This large dose of santonin was therefore 62.5 per cent (or 83 per cent) effective against ascarids and 0 per cent effective against *Dipylidium*.

In repeated doses:¹

Dog No. 110, weighing 13.6 kilos, was given a grain of calomel and a grain of santonin daily for a total of 6 grains of each in 7 days. The dog passed no worms and was found to have 2 whipworms postmortem. Six doses were insufficient in this case to insure entry of the drug into the cecum, and the treatment was 0 per cent effective against whipworm.

Dog No. 111, weighing 10 kilos, was given the same treatment and for the same length of time as the preceding dog, No. 110. This dog passed 33 ascarids in the 6 days following the first dose, and on postmortem was found to have 1 ascarid and 1 whipworm. Six doses were insufficient to insure entry of the drug into the cecum or the removal of all ascarids present. The treatment was 97 per cent effective against ascarids and 0 per cent effective against whipworms.

Dog No. 108, weighing 9.5 kilos, was given the same treatment, 1 grain each of santonin and calomel daily, for a total of 12 grains in 14 days. On the second day after beginning treatment the dog passed the thick posterior portion of a whipworm and on the third day passed the thin anterior end which is habitually found sewed into the mucosa, showing that following the toxic effect on the worm peristalsis had apparently torn the free portion of the dead worm from the attached portion, the attached portion subsequently becoming released and passing out a day later. On postmortem the dog was found free from worms, the treatment being at an early stage 100 per cent effective against whipworms.

Dog No. 71, weighing 12 kilos, was given daily doses of 1 grain each of santonin and calomel, approximately 2 days out of every 3, for a total of 61 grains in 3 months. After 7 doses the dog passed 1 whipworm. Postmortem the dog had 32 hookworms and 4 *Dipylidium*. The treatment was, therefore, 100 per cent effective against whipworms and 0 per cent effective against hookworms and

¹ This set of protocols was published by Hall (1919).

Dipylidium. The fact that over a dram of santonin was without effect on hookworms or tapeworms is rather conclusive evidence as to its entire lack of efficacy against these worms.

Dog No. 120, weighing 13.5 kilos, was given 5 grains each of santonin and calomel daily for a total of 25 grains in 6 days. This dose invariably caused vomiting in the course of a half hour, so the daily dose was cut to 2.5 to 3.5 grains and 9 such doses given in the next 10 days for a total of 25.5 grains. The dog was given a total of 50.5 grains in 16 days, an average of over 3 grains a day. The third day after the first dose the dog passed 14 whipworms and was free from worms postmortem. The treatment was therefore 100 per cent effective against whipworms.

Santonin combined with oil of chenopodium:

Dog No. 306, weighing 13.5 kilos, was given 1 dose of 3 grains each of santonin and calomel, and oil of chenopodium at the rate of 0.1 m. p. k. (mil per kilo). This treatment removed 43 ascarids and left 5 *Dipylidium*. Efficacy against ascarids, 100 per cent; against *Dipylidium*, 0 per cent.

Dog No. 308, weighing 14 kilos, was given 2 grains each of santonin and calomel, and oil of chenopodium at the rate of 0.05 m. p. k. The dog passed 1 ascarid and on postmortem was found to have 1 ascarid left. The treatment was, therefore, only 50 per cent effective against ascarids. This experiment does not indicate any synergistic action from the simultaneous use of santonin and chenopodium. Sollmann's (1918) tests on earthworms in vitro did not indicate that synergistic action is to be expected. As has been stated, santonin does not develop high efficacy in single doses, even in large doses, and gives its best results by what seems to be a cumulative action against such worms as ascarids. As regards chenopodium, the therapeutic dose against ascarids is 0.1 m. p. k.; the dose used here (0.05 m. p. k.) is commonly 100 per cent effective, though not dependably so, as the dose of 0.1 m. p. k. may be said to be.

Dog No. 310, weighing 8 kilos, was given 1 grain each of santonin and calomel, and oil of chenopodium at the rate of 0.05 m. p. k. The dog passed 6 ascarids and had 28 *Dipylidium* postmortem. The treatment was 100 per cent effective against ascarids and 0 per cent effective against *Dipylidium*.

Dog No. 13, weighing 9 kilos, was given 2 grains each of santonin and calomel, 25 minims of oil of chenopodium (almost 0.2 m. p. k.), and 0.1 grain of elaterin. The dog passed 2 ascarids and had 3 *Dipylidium* postmortem. The treatment was 100 per

cent effective against ascarids and 0 per cent effective against *Dipylidium*.

An examination of the foregoing protocols indicates that in single dose santonin fails to show a very high anthelmintic value against ascarids, even when used in doses of a half grain per pound of live weight. The protocols show that in repeated doses it manifests what appears to be a cumulative action against ascarids, gradually clearing them out. Repeated daily doses of 1 grain each of santonin and calomel will ultimately clear out whipworms. This may not be accomplished in the course of a week in some cases, and it would perhaps be advisable to give this treatment for 1 week, suspend treatment for a week, and then repeat for a week. The assurance of a cure would have to be obtained from fecal examinations for eggs; generally speaking, the diagnosis of whipworm infestation would be made in the same way. The protocols suggest that a successful termination to treatment for whipworms by repeated doses might be hastened by giving larger doses of santonin daily. Whether one cared to give the larger doses would depend partly on his judgment as to whether it was safe. So far, all our experience with santonin has indicated that it is quite a safe drug for dogs in the doses commonly employed; we have yet to see a dog killed with the drug, and the protocols show that the doses employed are in some instances rather large when compared with those commonly advocated for dogs.

Winslow (1913) says: "While 5 to 6 grains induce symptoms of poisoning in dogs, $\frac{1}{2}$ to 1 dram has often failed to produce a fatal result. * * * Santonin is very slowly absorbed from the intestines and is oxidized in the tissues and eliminated as oxy-santonins."

The protocols show that santonin is entirely without value against hookworms and *Dipylidium*, the use of over a dram of santonin in 3 months having no effect on hookworms and *Dipylidium* in the case of dog No. 71, and the use of half a grain per pound having no effect on *Dipylidium* in the case of dog No. 178.

In passing, it may be noted that Hall and Foster (1918) found that santonin in the 1- to 3-grain doses was only 24 per cent effective against ascarids, the efficacy rising when two doses were given instead of one. They likewise found santonin, under these conditions, entirely ineffective against hookworms and tapeworms, and only 7 per cent effective against whipworms. These findings are in agreement with those published here.

In connection with the administration of large amounts of san-

tonin, it is interesting to note that in the case of dog No. 71, which received a little over a dram in the course of 3 months, the animal's weight dropped from 12 kilos to 10 kilos in 1 month; to 9 kilos in 7 weeks; and rose slightly, to $9\frac{1}{8}$ kilos, 1 week before the animal was killed. This dog's eyes were very luminous, and the effect was heightened by the fact that the hair came out over a fairly wide area around the eyes. (See fig. 1.) There was also a pronounced loss of hair along the ventral surface of the neck and abdomen and in the axillary and inguinal regions. Sores formed around the nose. The dog was very active. In spite of the large amount of santonin administered, the digestive tract was normal except for a few small inflamed areas in the jejunum, the drug manifesting its customary lack of irritant qualities. Dog No. 120, which received 50.5 grains of santonin in 17 days, had a normal digestive tract.

Under the initials S. A. K. (1919), a writer has recently raised the question as to the advisability of using santonin in human cases where fever is present, as follows:

"I have met with * * * a variety of cases with high fever and history of vomiting or having passed a worm or two per rectum. I want to know whether santonin can be given when the fever is over 102 degrees. If not, what else should be tried? I used santonin in fever with fatal results. The fever does not subside for days together with any remedies. In such cases, knowing as I do that the cases are complicated with worms, I am at a loss to know how to give relief to my patients."

I have elsewhere expressed the opinion that febrile conditions are contraindications to anthelmintic treatment. There might be cases where it would be advisable to use anthelmintic measures during



Fig. 1.—Dog No. 71, showing loss of hair around eyes and in axillary region.

the course of a febrile disease, but I doubt it. Febrile conditions indicate the presence of toxins, and the administration of additional toxic material in the shape of anthelmintics would commonly be unwarranted. As regards the effect of the santonin on the temperature of the patient, our experiments show the following results:

Dog 71 started with an initial temperature of 100.8° F.; after a slight rise, this began falling and went to 99.6° in a week; there followed a gradual and irregular rise, reaching a maximum of 102.4° in 3 weeks; following a gradual 4-day drop to a little over 100° , the temperature jumped to over 102° and gradually fell to a minimum of 99.1° 5 weeks after the beginning of treatment; thereafter the temperature maintained a range between 100° and 101° almost all the rest of the time.

The slight initial rise in temperature following administration of santonin is duplicated in the case of 4 out of 5 remaining dogs. Following this there is a drop and then the temperature fluctuates, but in these experiments the temperature rarely deviated from the normal range, and then the deviation was small as a rule. Santonin apparently has but little effect on the temperature of the normal animal. Dog No. 71 showed little deviation from the range of 99.5° to 102.2° given by Malkmus as the normal for dogs, and dog No. 112 did not even reach these limits of deviation; these were the dogs receiving over 60 and over 50 grains of santonin, respectively.

In passing, the following facts from the *Chemist and Druggist* are of interest:

Some twelve years ago Germany acquired a monopoly of the santonin industry in Turkestan, and Hamburg was a center of the distributing trade. During the war exportation from Russia has been in the hands of one firm. There is only one factory producing santonin, and that is near Tashkent in Russian Turkestan. It now develops that for several years past no wormseed has been collected and that for 15 months manufacture has practically ceased. This is attributed to an acute famine which has prevailed, lack of labor, and insufficient crops of wormseed. There has also been a shortage of hydrochloric acid, which is used in the process of manufacture. These factors have caused a considerable shortage in santonin, and even after the war is finished and communications reestablished, it will require one or two years before the Turkestan factory is able to resume its normal annual output of 8,000 to 10,000 kilos.

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IN a recent communication from Dr. G. A. Roberts of Sao Paulo, Brazil, he states that the veterinary profession in Brazil at present is at a very low standard. There are very few qualified veterinarians but quite a few posing as such. The graduates are largely from France and Italy. Several are from a "poor excuse" veterinary college at Rio de Janeiro and others from a somewhat better school at Pernambuco. The three-year course in veterinary medicine at the Instituto de Veterinaria with which Dr. Roberts is connected began March 4, 1920, and the buildings were "dedicated" with inaugural exercises April 19th. There are 20 students in the first year.

The many friends and colleagues of Dr. J. E. Aghion Bey will be glad to learn that he has recently been promoted to Chief Veterinary Inspector of the Egyptian Domains, with headquarters at Sakha, Egypt.

Dr. Tage Ellinger, of the University of Copenhagen, is now visiting the United States studying the animal industry and live-stock problems of this country. He reports the good health of Prof. Bang and his continued interest in the veterinary profession of America.

SOME CHANGES IN THE IRREGULAR BONES OF CATTLE¹

By L. ENOS DAY, Chicago, Ill.

VETERINARY inspectors on the cattle-killing floors in Chicago and at other stations have for several years called my attention to a peculiar darkened condition of the osseous structure in cattle, accompanied by a softening of the centers of the irregular bones, more particularly the vertebræ and the bones of the sternum. This condition in the bones has been designated by some as hyperplasia of the bone marrow.

This disease is found in cattle of both sexes and of all ages. At one time we were led to believe that it affected only animals that were in excellent flesh, from 1½ to 2½ years of age, and it seemed to be confined to steers. Later we observed the disease in aged animals of both sexes that were quite thin in flesh. No statistics are available giving the exact per cent of cases found, but it is apparently quite low, probably one in many thousands slaughtered. At one time we thought that the disease might be confined to a certain locality, but we now find that it is liable to be found in cattle from any locality in the Mississippi Basin. I have never seen such a case, although it may exist, in range cattle. All of the cases which I have observed so far have successfully passed the antemortem inspection and were found on postmortem. I am therefore unable to give the symptoms, if any there be, shown by the animals, or to give any results of examination of the blood or secretions during life.

The postmortem lesions might well be divided into two stages, namely, slight and advanced cases. In the slight cases the changes are confined to the darkening of the cancellated structure of the vertebræ, sternæbræ and ribs, with a slight softening of their centers. In the more advanced cases the changes in the bones are more pronounced and other organs are involved.

The postmortem findings in advanced cases are as follows: "The alimentary tract appears normal, as are also the contents of the thoracic cavity. The spleen is usually normal in appearance or only slightly enlarged. The lymph nodes, especially those of the abdominal cavity, are slightly enlarged and edematous, with a dark

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

yellow pigment deposited through the central portion. In some instances small petechiæ are seen in the periphery. The kidneys are swollen and of a mahogany-brown color. The skeletal muscles are also darker than normal in color.

The entire osseous system is affected. The most prominent change is in the irregular bones; the vertebræ, sternebræ and ribs being those affected mostly. The latter are not changed in size or shape and are mahogany brown to nearly reddish black in color. The cancellated structures in the centers of the bodies of the vertebræ, sternebræ and ribs are broken down, soft, and easily cut with a knife. I have observed some cases in which the centers of these bones have become so soft that the contents would almost run out by the effect of gravity when turned upside down.

The long bones are normal in shape but are yellowish brown in color. The cancellated structure is deep red in color and softened. The marrow in advanced cases shows softening; with small areas of petechial hemorrhages.

The microscopical picture of the cancellated structure of the irregular bones is quite striking. There is a marked absence of the bone plates, which seems to be the result of destruction of the connective tissue framework and absorption of the lime salts. The marrow spaces are greatly engorged with white blood cells of various kinds, mononuclear leucocytes and lymphocytes being the chief invaders. There is also an increase in the myeloplax. Scattered through the marrow are numerous pigment granules which appear in clumps two or three times larger than a large mononuclear leucocyte. This pigment appears to be a bile pigment.

The kidneys and lymph nodes contain a large amount of yellowish-brown pigment, which is apparently bile pigment. The kidneys also contain large quantities of yellowish-brown pigment which is lodged in the epithelial cells lining the convoluted tubules, while in the lymph nodes it is found evenly distributed through the node. In some of the cases I have found many of the blood vessels of the kidney engorged with leucocytes, suggestive of leukemia.

Thinking that possibly this condition might be of an infectious nature, I have repeatedly injected guinea pigs and rabbits both subcutaneously and intraperitoneally, with negative results. I have also inoculated many tubes containing the ordinary culture media with the hope of getting a growth, but also with negative results. Assuming that possibly guinea pigs and rabbits might be refractory and that the disease might be transmissible in cattle from one to another, I injected two calves.

Calf No. 1, female, a grade Holstein, about 5 months old and in a good healthy condition, was injected intravenously into the ear vein with 2 c.c. of a suspension of broken-down bone tissue in normal salt solution. This animal remained in good health and was slaughtered about 2 months afterwards. On postmortem no lesions of disease were found.

Calf No. 2, female, aged about 4 months, grade Shorthorn, in good growing condition, was injected June 30, 1917, with 2 c.c. of a suspension of broken-down bone marrow in normal salt solution. On July 12 a differential blood count was made, with the following findings: Small mononuclear leucocytes, 17 per cent; large mononuclear leucocytes, 37 per cent; polynuclear leucocytes, 45 per cent; eosinophile cells, 1 per cent. This animal's temperature was taken daily until September 6, the highest temperatures during this time having been 104.2° on July 15, and 140.8° September 1. On all other days it seldom reached 103°, remaining from 102° to 102.8° most of the time. The calf was slaughtered November 16, or about 4½ months after injection, and on postmortem was found normal. During these experimental periods both of the calves grew well and gained in flesh quite rapidly.

Successful Farming in a description of "Bang farms"—which are farms on which provision is made for raising the offspring of well-bred tuberculous cattle—says: "While Federal supervision for Bang farms might not be obligatory, it is advisable to have the State inspector in charge exercise such supervision. When the farm is properly conducted the management should have nothing to fear from this, and it might go a long way toward insuring the success of the project through the allaying of suspicion."

Compulsory testing of whole sections rather than the present hit-and-miss plan of attempting to eradicate tuberculosis was encouraged at a recent meeting of breeders and farmers in Manson, Iowa. There were no details worked out at the meeting as to how they would go about the eradication under the proposed method, but the sentiment was that the present method was not thorough enough to make it worth while. The principal complaint came from the fact that it was easy for the clean herds to come in contact with those that were not clean under the present arrangement.—*Wallaces' Farmer*.

SOME OBSERVATIONS IN GENERAL PRACTICE¹

By H. E. BENDER, *Lititz, Pa.*

I FEEL that it is necessary to offer an apology for presenting a nondescript paper of this sort. After consenting to contribute something to the program, I waited until the very last minute for something to occur that would be worth while writing about, but as that something has failed to materialize, I will occupy the time allotted to me by referring to some conditions which I have encountered more or less recently. If the methods I am about to describe are homely and commonplace and do not conform to the recognized classical lines of treatment, it should be remembered that I am not urging their adoption but am simply discussing their satisfactory employment in my own work.

TORSION OF THE UTERUS

Of the conditions met with in bovine obstetrics, the one above all others which caused me most difficulty and was treated with least satisfactory results was torsion of the uterus. After going along for a good many years in the regular line of treatment, such as rolling and rotating the patient by means of ropes and using the hand and arm to effect reduction of the torsion, results were far from satisfactory. After having tried every method of which I could think on one of these cases, and being completely exhausted from repeated attempts at reduction, it occurred to me that if the tension could be taken off the uterus it might be possible to untwist the torsion. With that object in view attempts at reduction were renewed, with the result that delivery was finally accomplished. While the method is very simple and may be in common use by many practitioners, a brief description may not be out of place.

We know that by the law of gravitation a falling body travels in a straight line. By applying that principle to the condition before us it is reasonable to assume that if pressure can be taken from the front and sides of the uterus it will have a natural tendency to straighten to at least a certain extent. This can be accomplished by attaching a cross-piece above the hocks of the cow and using a block and tackle to raise the hind quarters of the animal; the internal organs will then fall forward and the lateral and backward pressure on the uterus will be greatly reduced; then the weight of

¹ Paper presented at the thirty-seventh annual meeting of the Pennsylvania State Veterinary Association, Harrisburg, Pa., January 19-20, 1920.

the fetus falling in a straight line causes the uterus to fall in the same general direction. Here is where the work of reduction actually begins. At this stage of the procedure the twist in the vagina is usually sufficiently relaxed to allow, with some difficulty, the introduction of the hand into the uterus. If possible, a rope should then be attached to both legs of whichever end of the fetus is presented. Assistants should pull on the ropes and attempt to withdraw the legs so far that they may be grasped with the hands. The assistants should pull and attempt to rotate the fetus at the same time. This can usually be done by turning leg over leg, and by thus rotating the fetus a rotation of the uterus occurs as well.

At this point attention should be called to the two most important factors in the whole procedure. First, when elevating the hind quarters of the cow be sure to have her body inclined in a direction opposite to that of the torsion, for that position will tend to allow unwrapping to be done more easily. The second factor is to be sure to rotate the fetus in a direction opposite to that of the torsion.

In cases of forward presentation it is not unusual to find the head deflected to a lateral position, and this deviation is probably due to the constricted condition of the vagina. In these cases it is usually necessary to use a crotchet in one or both eyes in order to draw the head into its proper position. The ropes on the crotchets can often be used to a decided advantage both for traction on and rotation of the fetus.

When the torsion is sufficiently reduced and the fetus has been partly withdrawn it is not necessary to complete the delivery with the cow in the elevated position. However, that is a matter that can best be left to the judgment of the operator.

Probably many present have been using this method, but for the benefit of any who may not have employed it I will say that it has invariably proved satisfactory for me, and I no longer attempt to reduce what may be called a real difficult torsion in any other way. Slight torsions are not infrequently encountered, but they occasion so little trouble that it is not necessary to touch on them in this paper. While I have no intention of discussing symptoms of torsion, I do believe that careful observation and close association of facts in various cases enables us in many instances, if not to diagnose, to at least suspect torsion even before making a vaginal examination.

PROLAPSUS OF THE UTERUS

Prolapse or eversion of the uterus is a condition which is frequently encountered following closely after parturition, and at

times it puts a real test upon our resourcefulness before we succeed in its proper reposition. While admittedly some eversions are very difficult to treat, yet in general the task of replacing a prolapsed uterus is largely what we make it and does not necessarily call for an exhibition of brute strength. If we make it a rule to go about the work with some general system or plan in mind and remember a few essential facts, the work can surely be made easier and the results as a rule satisfactory.

There are several steps in the routine, all of which have an important bearing on the results. Briefly they are: (1) preparation, (2) reduction and reposition, (3) retention.

The matter of preparation can be passed over very briefly. As a rule by the time we see the patient the uterus is badly soiled with feces, covered with filth and litter, and often considerably bruised. In some instances the placenta is still rather intimately attached to the cotyledons and should be carefully removed if it does not cause excessive hemorrhage. The uterus should be very thoroughly cleansed with warm, mild antiseptic solution freely applied. In addition to this cleansing there are numerous preparations which may be used on the uterus, such as opium, belladonna, alum solutions, etc. Latterly the use of sugar has come into vogue with some veterinarians. Whatever tactics are employed in replacement, if straining is severe, opiates may be administered provided other conditions do not contraindicate their use. Straining may also be lessened by passing a rope over the back and around the chest and twisting it tightly. Grasping the skin above the spine with the hand or pinchers will often cause the animal to lower her back and may help to lessen the straining. In preparing the uterus for replacement a clean cloth should be placed beneath it, and if it is very much congested and swollen it should be gently kneaded or massaged, or it may be wrapped with bandages to reduce the size.

By the term reduction I mean to refer to the passing of the everted uterus into the pelvic cavity, and by reposition is meant the replacing of the uterus into its proper shape and position in the abdominal cavity.

There are a number of methods which can be used in the process of reduction, depending largely upon the severity of the case in hand and also upon the judgment of the obstetrist.

If the cow is standing she should invariably be raised in the hind quarters. This is one of the greatest factors in the work, regardless of the position in which the cow may be found. If she is standing her rear end may be raised by putting sufficient material on the

floor and forcing her to stand on it with her hind feet; or, when there is a platform with a drop or drain back of the cow, she may be reversed in the stall and the front feet placed in the gutter and the hind feet on the platform. When the animal is in the recumbent position I use every device I can think of, and am willing to use considerable time in trying to get her into the standing position, for if that can be accomplished and she can be raised by the hind quarters a large part of the work is done, as the pressure on the abdomen as well as the forcing of the internal organs backward make the work doubly hard when the animal is lying down.

One of the simplest methods—and this is used most advantageously when the uterus is wrapped or bandaged—is to have a clean cloth or sack placed underneath the uterus and the whole raised by two assistants so that there is no downward pull by the weight of the organ. The uterus can then be pressed in from the sides by using the fists, and the bandages can be gradually unwrapped as the uterus is fed into the vulva. This method is often useful even when no bandages are used.

Another method is to apply the fist to the most dependent part of the uterus and push the fist slowly upward through the mass until it enters the vulva; then, by gradually pushing forward during the interval when the cow is not straining, the uterus rolls up on the arm somewhat in a manner resembling a telescoping process. It is often surprising how easily reduction can be accomplished in this way, especially if one is endowed with a long arm; but on many occasions we lack a certain length in order to replace the uterus completely, and if we attempt to withdraw the fist to place it in a different position the straining of the cow will cause the uterus to follow, and in this particular this method can be improved.

By using a somewhat pear-shaped block of wood securely fastened to an iron rod, the whole to be several inches longer than the arm, we have a useful instrument to employ in these cases. The ball of wood should be somewhat larger than a fist and be perfectly smooth and rounded on top and fastened on the iron rod, which should be provided with a sort of concave grip or handle. By applying this instrument to the most dependent part of the uterus, in the same manner as if the fist were being used, and pushing it carefully into the vulva, pressure forward will carry the uterus into a position that can scarcely be reached with the hand. The additional length of this instrument is handy in assisting in proper reposition in the abdominal cavity and in taking out the folds in the uterus. While my experience in using this instrument has been

rather limited, there does not appear to be any more danger of bruising or rupturing the uterus than there does from using the knuckles. Dr. Brady of the Conestoga Veterinary Club has been using it for quite some time and claims good results.

Last, but not least useful, of the several methods to be referred to is that of raising the hind quarters of the cow by a block and tackle. This is usually a method of last resort and can as a rule be used successfully when all others fail. If it were not for the trouble of raising the cow it would be a practicable procedure in all cases of eversion in which there is a great deal of congestion and swelling. As in the other methods, the uterus is raised on a cloth and gradually pushed back into place.

Proper reposition and retention are so closely associated that they may be referred to at the same time. If reposition is careful and complete, retention in nearly all cases is easy. Diligent effort should be made to remove every little kink and fold and to push the point of the horn as far forward as possible, being careful that the point is left not in the least turned back. The inside of the uterus may also be swabbed with a soft sponge moistened with a warm, mild antiseptic solution. During the time these manipulations are in progress the uterus contracts considerably, and final steps for its retention can be proceeded with.

While it may not always be necessary, without exception I resort to suturing. Two or three sutures are placed in the lips of the vulva and the X or cross-sutures are placed in the skin, the uppermost at the point of the ischium and the other somewhat lower down.

One other point that I believe is of utmost importance and which is always carried out before leaving the case is to put plenty of straw or other material under the hind quarters of the cow so that she inclines downward and forward to a decided degree. This is left in position for some days or until there is no further danger of the uterus being again everted. If these steps are taken in proper reposition and retention the need for using a pessary or truss is very exceptional.

We frequently see inquiries relative to replacing the everted uterus of the ewe. This operation can be carried out very easily by having an assistant grasp the wool of the back in the lumbo-sacral region and raise the hind feet from the ground. By so doing the internal organs fall forward and straining is almost eliminated because the feet can not be fixed to the ground.

OPEN JOINTS

I had no intention of making this a paper on obstetrics, and as my subject allows an unlimited scope I wish to refer to a condition of which I have recently had quite a series, namely, open joints. In the treatment of open joints one man's guess is about as good as another's, so I feel free to make my guess even though it almost completely ignores antisepsis.

While open joints are encountered at a number of locations, two of the most common sites of occurrence at this season where horses are sharp-shod are the tarsal and the humero-radio-ulnar articulations. When called early on these cases before infection occurs, and if the opening is not too large, a blister will occasionally cause sufficient swelling to check the synovial discharge. In practice, however, we are seldom called early enough to follow that line of treatment.

When the opening is quite large and the discharge profuse I resort to fomentations with hot water, then have the part carefully rubbed dry. When there is much swelling, astringent lotions, lightly rubbed until quite dry, are useful. On the wound itself an antiseptic powder (boric acid has been most satisfactory to me) is pressed well into the opening and left as a thick layer over the wound. The boric acid can be applied quite frequently between bathings with hot water. Probing and injections into the wound are deferred as long as possible and are then used only in cases where infection is quite general.

If the foregoing treatment, even in cases that seem to show very slight improvement, is persisted in for some time the discharge usually diminishes and finally ceases. While there is as a rule considerable thickening and induration of the tissues by this time, I am always willing to take a chance on their gradual reduction rather than with a continuous discharge. With me the primary object is to cause the wound to seal just as early as possible.

Only in cases where infection becomes general throughout the bursæ are injections employed, while any one of a number of antiseptics may be used, such as Dakin's solution, the mercurial or coal-tar antiseptics, etc. Probably the most useful is iodine and ether. In injecting the solution the syringe is introduced only a short distance and upon its withdrawal a finger is placed over the opening to prevent the immediate back flow of the fluid.

Absolute rest is necessary, and when possible a large, roomy box-stall is provided, especially in cases where the hock joint is affected. The bedding should be of short material such as cut straw,

shavings or hay blossoms, and be kept clean and dry. In the course of some days the animal usually lies down a good deal, and he should not be disturbed even for treatment until he rises voluntarily. In many instances it is difficult for the patient to get up, and when found in the act of rising he may be given some assistance. In a box-stall he will have much better opportunity to help himself and use the injured member as little as possible. While horses in which the hock is the seat of injury will often lie down, those in which the elbow joint is affected will seldom do so unless completely tired out from standing. In either case the sling will be of advantage in resting the horse and will many times prevent a great deal of decubitus.

I think it is safe as a rule to regard those cases as hopeless—and this is especially true in involvement of the elbow joint—in which after continuous treatment there is increased discharge in which the synovia and pus are mixed with a sero-sanguinous exudate and where the tissues around the joint become hard and fibrous. In nearly all cases where there is considerable blood mixed with the exudate, not necessarily in the beginning but rather late, it is reasonably safe to expect serious injury to the bone or cartilaginous structure of the joint. In numerous instances in which postmortem examinations were carried out the bone was found badly damaged and in some cases necrotic.

A CORRECTION

In the article entitled "Field Observations in the Control of Abortion Disease," by George M. Potter, in the May number of the JOURNAL, the statement on page 153, second paragraph, should have read as follows: "Coöperative work of this kind was conducted in 20 counties pretty evenly distributed over the State" (instead of "6 counties").

How long will a cow live is answered in part by Old Grannie, a Scotch cow of the Aberdeen-Angus breed. She was the first cow in the herd book and lived to be nearly 36 years old and dropped 25 calves in Scotland.—*Wallaces' Farmer*.

MEAT INSPECTION AND ITS VALUE AS A SAFEGUARD TO THE PUBLIC HEALTH¹

II.

By R. W. TUCK, *New Orleans, La.*

MEAT inspection performs many functions, but chief of all is protection of public health.

In the early Biblical days the ancients recognized the need of some control of the meat supply. This duty was delegated at that time to the religious bodies. While today matters of church government and sanitation may be looked upon as separate and distinct functions, a close study of the early Jewish Church laws show us that the physical as well as the spiritual welfare of the community was considered in framing those early Levitical laws.

As we pass down the historical cycle from ancient Biblical times through various ages, we are frequently reminded of the necessity of inspecting meats. The early Egyptians were forbidden to eat pork, probably due to the tapeworm. Later the Athenians, and afterwards the Romans and the followers of Mohammed had similar laws. Our own early colonists recognized the necessity of some restrictions, and various city and State laws have existed for many years, indicating the necessity of meat inspection to protect the health of the meat-consuming public.

It may be well to review briefly the training necessary to make one competent to supervise the meat trade so as to give the greatest protection to human health against the numerous dangers that attend the use of unwholesome meats as food.

First and foremost, the matter of a general basic education is of supreme importance. It has been with great satisfaction that I have noticed the requirement of the preliminary education of a veterinarian mounting higher and higher, and while a full high-school course should be the least we will accept, a partial college course before entering a veterinary college should be our aim. This need will be evident shortly after entering the service, but will be more keenly felt a little later, when the inspector comes more closely in contact with the work.

If one is to rise above the plane of a mere cog in the ordinary routine of inspection he must have a broad understanding of human nature, so that many of the annoyances to which an inspector is

¹ Paper presented at the fifth-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

subjected can be handled with discretion and cool judgment, instilling confidence, reducing friction to a minimum, and resulting in the work being carried on without appeals to higher authority, or the need of coercive measures. He is thrown in contact with people of learning, and called upon to make quick decision on matters requiring wide knowledge, where a limited education places him at a disadvantage and the work of inspection is discredited.

The veterinary education should be thorough, embracing all branches, and not confined to specializing on meat inspection. For instance, in a law suit in which I was witness, a person stated that the cows were so hungry when they were released from the cars that they began eating the fences, a statement that I hardly think he would have made had he been conversant with the anatomy of the teeth of cattle.

The lack of proper instruction in all lines of veterinary science will be apparent in antemortem and postmortem work, inspection of meat products or sanitation.

In antemortem work an inspector must be able to diagnose disease in live animals and in postmortem to recognize lesions of disease in the carcasses. The diseases he may encounter on the killing floor and in the pens are varied and numerous, in fact, embrace almost the entire category of the diseases affecting domestic animals.

A thorough knowledge of anatomy, including comparative veterinary anatomy, is imperative, so that the bones, muscles, viscera, etc., of animals may be readily recognized and fraud may be detected when meat or organs of various animals are substituted one for another; also any departure from normal, whereby one is able to recognize lesions of disease. The matter of sex and age is also determined by these means.

Pathology must be studied in all its phases, so the inspector may know just how to judge the flesh of animals affected with disease in its various stages.

Physiology has its importance, as by it we are able to indicate certain conditions which may render meat unfit for food, as immaturity, pregnancy, etc.

The life history and identification of various animal parasites requires close study, as meat infested with them may become a menace to health or dangerous to human life.

Bacteriology plays a great part in the work of the meat inspector, teaching him of the dangers that lurk in meat from animals infected with contagious or infectious diseases. Training along these lines

can not be too thorough. Again, bacteriology must be called upon to aid in judging meats that have been processed and later have deteriorated, as in cases of canned meats, cured hams, etc.

Chemistry is another study that can be used with great advantage in determining what is fit for food and what must be rejected. The theory of ptomaines and toxins calls for chemical experience. Then again, the analysis of fats, oils, spices, sausage, water, etc., are in these days matters of great importance to one intrusted with the inspection of meat and its products.

General sanitation and refrigeration must be given close attention, when one remembers how readily meats are liable to become contaminated or to deteriorate during the processes of slaughter and manufacturing.

General knowledge of packing-house construction and methods of operation, in so far as they pertain to the slaughter, curing and manufacture of meats and meat products, is imperative. While it is realized that such information can not be gained without coming into actual contact with these various institutions, that they most closely concern the lay inspector, and, it may be well to note, that in the ordinary course of promotion the veterinary inspector is not required to function fully in this line of work until after some years in the service, yet one can readily see that it is his duty, whenever opportunity offers, to be alive and gain all the knowledge of the subjects possible.

Having briefly reviewed the requirements to fit an inspector for this work, let us consider what he can accomplish by using his special training to protect the public health.

Scientific study has fully demonstrated that there are certain diseases of an infectious nature that occur in man as well as in domestic animals, as tuberculosis, rabies, charbon, etc., and at least some of these may be contracted by man eating the flesh of animals containing the virulent organisms that cause these diseases in the various animals.

It is one of the functions of meat inspection to see that animals about to be slaughtered are examined carefully for any physical signs of disease, and if such are found, the affected animal is properly marked for identification and slaughtered in such a manner that it can not contaminate other animals. At the time of slaughter special examination of all the glands, viscera, etc., is made, so that a thorough knowledge as to the extent, stage of the disease, etc., may be ascertained and a correct judgment as to the wholesomeness of the

flesh be made. But the functions of meat inspection do not stop here, for, after deciding the fit and the unfit, it proceeds to dispose of that which is unfit, including all parts infected with the disease-producing organisms, rendering them innocuous. If there are any portions of the animal that, after certain processes, as sterilizing, may be safely used for food, these operations are carefully supervised, so that any danger to human health is absolutely eliminated.

It is an established fact that there are certain animal parasites which during at least a portion of their life cycle reside in the flesh or organs of certain domestic animals, and when the flesh of such animals is used for human food they have in many cases resulted in injury to health or even in death. In this class may be mentioned trichinae, immature in the muscles of swine; cysticerci in the muscles of swine and cattle; hydatids in the viscera of swine and cattle, and distoma, particularly in the lungs of swine. It is the function of meat inspection to locate these various parasites during the process of slaughter, by special examination of those particular organs or parts which science has demonstrated they prefer for their habitat, and to see that they are destroyed by refrigeration, cooking, etc., and in cases where the flesh itself has become unwholesome, to dispose of it properly.

There are certain animal or vegetable organisms that pass more or less of their existence in the body of domestic animals, which, while they may not be conveyed to man by eating the meat, cause conditions rendering unwholesome the flesh of the animals in which they exist. Some of these organisms, as those causing acute inflammation, pus, etc., produce tissue changes in the body of their host to such an extent that the flesh is directly injurious; others, as distoma invading the liver, etc., result in changes which cause the flesh to become unpalatable and of little or no food value. Meat inspection eliminates these sources of danger to human health on the killing floor.

Meat, particularly in its fresh state, forms a very fertile medium for the growth and development of organisms which, if taken into the human body, may result in sickness or even death. Unfortunately, these germs are very abundant and readily exist in the air, or upon the floor, walls, etc., of ordinary killing establishments, and particularly where sanitary laws are not enforced.

Meat inspection protects the health of the meat-consuming public, and also the employes engaged in slaughtering and preparing meats for food, by requiring that such plants be properly lighted and ven-

tilated, that they be provided with concrete or brick floors, and side walls of brick, cement or other material that will not absorb noxious matters and can be readily cleaned. A liberal supply of clean hot and cold water is required, so that all portions of the building can at all times be kept clean easily, thereby reducing chances of contamination; also for use in cleaning the carcass or parts during the various processes of slaughtering and preparation for food, and maintaining all utensils as well as the clothing of the men in a sanitary condition.

Inspection further protects the employes by properly disposing of animals or carcasses infected with diseases which might be conveyed to them during the process of slaughter, such as anthrax, etc., by requiring the employes to be clothed in a sanitary manner, also that they be provided with properly equipped quarters for dressing and toilet facilities, including laundry for clothes, shower baths, towels and heat when necessary.

As the flesh of various animals, and particularly those portions used for food, are very highly organized, it is particularly liable to decay. It is fully established that during the process of decomposition there are developed in the meat certain bodies or substances which, if taken into the human system, result in sickness or death. There are also other conditions that render the meat objectionable to the palate so that instead of a pleasing and satisfying food it is entirely unavailable for nourishment. In this instance the inspector guards against the organisms causing decomposition by requiring the slaughtering to take place under strictly sanitary conditions, and later the removal of the animal heat in such a way as to reduce the development of these germs to a minimum, and, after chilling it, that the low temperature is maintained until the meat reaches the consumer.

Aside from refrigeration other measures are taken to prevent decomposition of meat. Chief among these are curing, by the use of salt, sugar, wood smoke, etc., and heat as in cooking, sterilization, etc. While the proper application of any or all of these will obtain the desired result, their improper use may produce meat dangerous to health or unpalatable. Meat may become dangerous either by using too small an amount of salt or smoke, or too little heat, as in the process of canning. It may lose its nutritive value and become unpalatable by using too much salt, smoke, or even heat.

Owing to the fact that the spirit of covetousness occasionally develops in human nature, certain practices must be guarded against,

which, if allowed, would result in the consumer being defrauded. The practices referred to are such as substituting products of a lower grade for those of a higher; for instance, selling shoulders for hams, horse flesh for beef, veal for chicken, adding certain offal to pork and selling it as pork sausage, or suet to fat pork and calling it lard. These are classed as fraudulent, but one can see that if these practices were unrestricted they might become detrimental to health.

Meat inspection does not stop at protecting the public against unwholesome or inferior meat products, but it also acts as an agent against the waste of this valuable food. This is accomplished by notifying the manager of a plant if the meat is being neglected during the process of curing or storage. It is not infrequent that thousands of pounds of food are saved in this way.

The value of meat inspection as a safeguard to public health is in direct relation to its efficiency. To be efficient it must be effective, and it can not be effective unless it is so applied that it covers the whole field open for its usefulness. At the present time less than two-thirds of the meat slaughtered in this country receives even a cursory inspection, and not over 60 per cent is under competent inspection. Since all exported meats must be inspected, it goes to show that the 40 per cent of partly inspected or uninspected products are consumed in our own country. These conditions are the result of certain organic laws or are due to limitations of existing laws. For instance, we know that the Federal law relating to meat inspection, in so far as its limitations will allow, is carried out in an efficient manner and affords a great protection. Yet this law can not be applied outside of those limits to which the United States Constitution and Congress confine it, that of meats entering interstate or export trade.

For example, an animal is purchased for slaughter at one of the plants under Federal supervision, which requires that the animal receive competent antemortem and postmortem inspection. The dressed carcass leaves the place in first-class condition, bearing the official label. It is forwarded to a market where no inspection is provided, hung in a refrigerator poorly iced and reeking with filth. The meat is thereby contaminated by numerous organisms which render it unwholesome. Probably after being removed from the refrigerator it is hung in an unscreened shop where flies by the hundred come in contact with it, thereby counteracting most of the effort of the Federal inspection to safeguard the public health.

While this illustration applies to a considerable quantity of meat, it must not be taken as a reflection upon the effectiveness of the

Federal service from an operative standpoint, but it does show what defective limitations may result even where competency and honesty of purpose are carried out.

We as veterinarians have been intrusted with general supervision of the meat trade, and it is up to us, individually and collectively, to use our best endeavors in our respective locations to ascertain what protection human health is receiving against danger from an unwholesome meat supply. Where no laws exist, assist in getting them passed. Where laws exist but are not effective, find the cause, suggest the remedy, and give your whole-hearted support toward efficient enforcement.

In this connection it is my opinion that much of the present inefficiency and unpopularity of State and municipal meat inspection is due to a lack of uniformity in the inspection of meats. For instance, I have seen postmortem inspections that consisted of a glance at the carcass, after dressing, others consisting of a casual glance at the viscera, at time of removal; in other instances the inspection was confined to marking the dressed carcass. I have noted inspection of cured meats that was limited to counting the number of pieces or taking the count from an invoice, so that a charge could be made for the inspection.

It appears to me that a plan could be formulated whereby no matter how limited the inspection available it could be performed in a uniform manner. It could be required that in making a post-mortem inspection it be imperative that certain glands and muscles be incised, and that special attention be given to those parts or organs of animal known to be the preferred seat of certain parasites or the most frequent location of lesions of disease. If an inspection of cured meats, such as hams and bacon, were provided for, it should include the use of a trier.

In order that meat inspection may become a more effective safeguard to public health I would suggest that the American Veterinary Medical Association, representing the veterinarians of this country, to whom custom has delegated the supervision of the meat trade, take definite steps to formulate, promulgate and enforce uniform methods of inspecting meats. This I believe would remove much of the unpopularity with which certain lines of meat inspection are now regarded and add to the financial success of the veterinary profession.

CLINICAL AND CASE REPORTS

REPORT ON AN OUTBREAK OF RABIES AT DOW CITY, IOWA¹

By J. A. BRILL, Dow City, Iowa.

DURING the past spring and summer I encountered a rather extensive outbreak of rabies in my territory, which is situated in the southwestern portion of Crawford County, Iowa. The infection in question was brought into this territory by two coon dogs shipped from a point in Tennessee to a farmer residing two miles south of Dow City. Approximately a week after their arrival these dogs with a number of other dogs participated in a coon hunt. One of the Tennessee dogs while on this hunt developed vicious tendencies and bit one of the local dogs quite severely. The other Tennessee dog was apparently normal at this time. The dog which had become vicious was chained up but broke loose by slipping its collar and escaped, and no trace has ever been found of it. Shortly afterwards the dog which had apparently been normal developed symptoms of dumb rabies, which the owner called distemper and treated as such. Sufficient to say that the dog did not improve under this treatment and died. I did not have the opportunity of seeing either of these dogs, but by questioning the owner I had no doubt that these two dogs were the original spreaders of the rabies infection and that they were infected with rabies at the time of shipment from Tennessee.

On April 22, 1919, I received a call from 6 miles south of town from the owner of the dog which had been bitten 3 weeks previously by the Tennessee dog. He informed me that his dog had disappeared in the morning and the neighbors had told him that the dog had appeared as though mad and had attacked everything which crossed its path. The history and the symptoms exhibited by the dog were conclusive of rabies. The dog was killed and its head sent to the veterinary department of the college at Ames, where a positive diagnosis of rabies was made. During this fit of viciousness the dog had visited 14 or 15 farms and had traveled approximately 16 miles in an interval of several hours, attacking whatever crossed its path.

Immediate steps were taken to quarantine dogs in the infected area

¹ Presented at the thirty-second annual meeting of the Iowa Veterinary Association, Des Moines, Iowa, January 13-15, 1920.

and adjacent territory. I made a trip over the entire area covered by the dog and recommended the shooting of dogs which had been exposed and the muzzling and confinement of unexposed dogs. Furthermore, instructions were given to report suspicious actions of any animal. These recommendations were carried out in the majority of instances.

On May 12 a call was received from 12 miles south of town to a farm where the owners carried on the breeding of Russian wolf-hounds, to see a dog which was acting strangely. The owners informed me that this dog had been bitten by the rabid dog on April 22, but because of its value they did not care to kill it unless it developed rabies. It showed pronounced symptoms of rabies and had torn its sheath and other parts into shreds with its own teeth. The dog was killed and the head shipped to Ames, where a diagnosis of rabies was made after a microscopical examination. I might add that in all cases where it was possible the head of the suspected animal was cut off and shipped for laboratory diagnosis. No other cases of rabies developed on this farm.

On May 16, while out in the same territory I stopped at a farm house for dinner. My attention was attracted by a 4-months-old pup which had been acting strangely. He seemed to be dull and listless; the lower jaw was paralyzed; considerable salivation was present; the eyeballs were turned outward, and the animal gave an occasional sharp bark followed by a series of unequal barks lower in pitch than normal. On being questioned the owner informed me that the dog had bitten his wife and sister-in-law 3 days previously and had shown a general vicious trend for several days. The pup was killed and the brain revealed the presence of Negri bodies. The two women were prophylactically treated against rabies by a local physician.

About 3 weeks later a barrow and three sows on this place showed the following symptoms: Extreme irritability, rooting the ground, and biting all objects within their reach. After such a period they would lie down apparently normal. There was considerable salivation present and loss of ability to swallow. The hogs would fall on their sides and squeal with an altered pitch of voice. These hogs were killed, but as it was very warm the heads underwent putrefaction before I was able to ship them. No more cases developed at this place.

On May 27 a stray dog which had developed rabies was killed 1 mile east of town.

On June 4 I was called to see a suckling calf, one of a herd of 5

cows and 6 calves just across the road from where the Russian wolf-hound had previously developed rabies. The calf was continually bawling and had chased the owner out of the pasture several times. It was killed and the head sent to Ames, where a diagnosis of rabies was made. Doctor L. E. Willey informed me that this brain contained the largest number of Negri bodies he had ever been privileged to see. The remainder of the herd was treated as soon as I was able to procure rabies vaccine. Two calves died of rabies about 30 days after treatment.

On June 20 a client of mine brought in a pup about 2 months of age exhibiting clinical symptoms of rabies. The pup's mother had died 3 weeks previously, exhibiting the same symptoms, and the owner informed me that she had killed all her pups except the one in question and had severely bitten it. The pup was killed and an examination of its brain showed the presence of Negri bodies. This pup had bitten one of the children on the hand, and this child received treatment against rabies. A calf, which was a sort of pet about the place and which had free access to the yards in which the dogs had been confined, died of rabies in the early part of August.

On July 25 I was called to a farm where I found 2 calves exhibiting characteristic symptoms of rabies. Laboratory examination showed rabies.

On July 28 a dog at Buck Grove, Iowa, 8 miles east of this farm, in a supposedly clean area, came down with rabies, but upon learning the history of the case I found that this dog had taken part in hunts with dogs which had been exposed.

I have omitted several cases as I did not care to burden you with an exhaustive report. The period of incubation has varied from 10 days to 5 months in these outbreaks, but allowances should be made for the possibility of an intermediate unrecognized exposure. The quarantine was in effect for 5 months and was kept very rigidly, most owners of dogs showing a disposition to prevent any further spread of rabies. I sincerely hope, however, that a law will be enacted which will give a police officer the power to kill all dogs in an exposed area. This would be beneficial in preventing the spread of this disease, once it gets into a community.

MELANOTIC SARCOMA AND SO-CALLED MELANOSIS

By SAMUEL HOWARD BURNETT, *Denver, Colo.*

A RECENT number of one of the veterinary periodicals of this country contains an article in which a veterinarian writes of another interesting case of "melanosis" in the horse. It would be interesting if it were truly a case of melanosis in the horse, although melanosis has no clinical significance. It is important, however, that it should not be mistaken for something that is of clinical importance.

Melanosis in the horse has been reported, so far as I know, but once. Goldberg¹ states that he has observed melanosis in black, brown and sorrel mares and geldings. Melanosis is not uncommon in calves and sheep. Melanotic sarcoma, or melanoma, is common in horses and is not uncommon in other kinds of animals.

Usually the neoplasms occur as rounded or nodular masses. Occasionally in the horse there is, besides the nodular growths, a diffuse growth spread out on the surface of the omentum, mesentery, pericardium or other serous surface. In the animals in which such a condition is found it is a development later than the rounded, restricted growths. It is the end condition and shows that the resistance of the animal has been overcome. A similar condition is seen in tuberculosis in cattle. So long as the animal's resistance is good the tuberculous foci are scattered, rounded nodules. When the animal's resistance is overcome a diffuse growth of tissue on the omentum or other serous surface may be found.

What would other members of the profession say of one who should call such a tuberculous lesion by the name of some harmless condition? Yet that is what has been done in the case of the most highly malignant of the tumors of the horse. Calling a case of melanotic sarcoma, where the neoplasms occur as rounded or nodular growths, "melanosis," shows that the author uses melanotic sarcoma and melanosis as synonyms. That was the case in the article referred to. It is incredible that a veterinarian should not recognize such growths as malignant tumors. It does not speak well for the state of advancement of professional knowledge that such a confusion of terms should continue to be made.

No real pathologist has ever confused the two conditions. Kitt's "General Pathology" is clear on the subject. Mention is made in

¹ Jour. Amer. Vet. Med. Assoc., vol. 51 (1919), p. 262.

Ziegler's "General Pathology" of a peculiar condition of melanosis in the internal organs of certain domesticated animals. If Ziegler had mentioned the animals (calves and sheep) in which the condition occurs, no one could have misunderstood what kind of a condition he had in mind. Anyone who knows a little veterinary pathology can not well misunderstand the meaning. It seems clear that when Ziegler mentions the deposit of black pigment in certain of the internal organs he does not mean the deposit in neoplastic growths.

Naming a malignant tumor by the color of the growth seems on the face of it absurd. It would be as sensible to call a case of chloroma chlorosis, though chlorosis is the name of an entirely different condition. Suppose there were such a thing as blue tumors. I have seen blue-green enlarged lymph glands and solid areas in the lungs of a cow. What would be said if blue tumors were called a case of cyanosis?

A good deal is being written and spoken about advancing the standing of the veterinary profession. Why not each of us apply a little advancement to himself? Care in using technical terms will help, I am sure.

NECROLOGY

Dr. C. H. Rike, of Indianapolis, Ind., died last December. Dr. Rike graduated from the Indiana Veterinary College in 1917. He was admitted to the A. V. M. A. in 1918, and was an inspector in the Bureau of Animal Industry.

Mrs. Young, wife of Dr. C. J. Young of Omaha, Nebr., died May 16, following a long illness.

ABSTRACTS

A SIMPLE METHOD OF OBTAINING PERMANENT CULTURES OF DELICATE BACTERIA, AND THE PRESERVATION OF THE VIRULENCE OF ANIMAL PATHOGENIC ORGANISMS. E. Ungermann. Arb. K. Gsndhtsam., vol. 51 (1918), p. 180.

The possibility of preserving short-lived and delicate organisms for long periods is shown by the work of Neufeld on pneumococcus. (Kolle and Wassermann, *Handbuch der Pathogenen Mikroorganismen*, vol. 4, p. 524, 2 ed.) By this method, blood or organs from a mouse dead from pneumococcus sepsis are dried in a desiccator at room temperature, protected from light. This horny material, inclosing the organisms, is active from one-half to three-quarters of a year. When powdered, suspended in bouillon and injected into a mouse, fatal infection occurs. The pure culture obtained from the heart blood of such a mouse has the same virulence as the original culture used months previously.

Ungermann's method for the preservation of meningococcus: Rabbit serum obtained sterile, in test tubes, is heated 30 minutes at 60° C. under a layer of paraffin oil. Inoculate the serum, using sterile glass capillary pipettes. The serum may be diluted to 3 volumes, using sterile salt solution, although the undiluted serum seems to be preferred. Strains which lived 8 to 11 days on agar, serum-agar or blood-agar, aerobically at 37° C., when grown anaerobically in serum as described gave surface cultures on blood-agar plates 16 months after inoculation of the serum.

The biological properties of the meningococcus strains remain unchanged in these permanent cultures (Dauerkulturen). Their agglutination titer generally remains unaltered. Morphologically there are no changes, but there are slight alterations in staining reactions.

Gonococcus is as durable as meningococcus under the same cultural conditions. The growth of gonococcus in serum is decidedly advantageous for the preparation of vaccine, etc., particularly in view of the difficulty of growing the organism in the usual culture media.

Various strains of pneumococci grown in rabbit serum anaerobically at 37° C. as above described retained their viability 9 to 15 months (p. 193). The pneumococcus cultures form acid, precipitating some of the serum protein, but without inhibiting growth. Probably the proteins neutralize the acid, protecting the organisms from the acid somewhat as calcium carbonate does when added to some media.

Streptococci can be preserved a long time in the anaerobic serum, i. e., a year, without showing any change in vigor when sown on blood plates. Cultures of these same strains on blood-agar could be subcultured for only 5 to 7 weeks. After 5 months' preservation in serum culture two strains of streptococci showed no appreciable loss in virulence to mice inoculated with a bouillon subculture.

Highly virulent cholera vibrio and typhoid bacilli retained their virulence in anaerobic serum culture, especially if they were allowed first to grow and then the culture was preserved at refrigerator temperature about 4 to 6° C. W. N. BERG.

THE RELATION OF GAS GANGRENE OF MAN TO BLACKLEG OF ANIMALS.

Steinbrück. Berl. Tierartzl. Wehnschr., 1918, p. 441. Abstract in Monatsh. Prakt. Tierheilk., May, 1919, p. 566.

From his knowledge of blackleg and his experiences with gas gangrene gained during the war, Steinbrück believes that the causative agent of human gas gangrene is not to be found in several distinct bacteria, but in a single organism which is the blackleg bacillus or at least one very similar to it. The experiences with blackleg vaccination showed further a new means of combating gas gangrene also with a vaccine. Conradi and Bieling sought an etiologic relationship of both diseases by comparing the causative agents in a human type (gas gangrene bacillus) and a bovine type (blackleg bacillus). Collectively studied strains of blackleg bacillus, gas gangrene bacillus, edema bacillus and *Bacillus phlegmonis emphysematosae* show two different forms according to their phase of development, a vegetative form on dextrose-agar and a spore form on bovine serum. The older the colony is the more spore forms it contains; the younger the more vegetative forms. The course of development of gas gangrene in man corresponds with blackleg (variety of the disease picture). With both, putrefaction develops with the increase of spore forms. Also the mode of natural infection is the same with both (deep wounds, infection with spore-containing earth, and simultaneously with aerobic wound infection germs). An infection through the oral mucous membrane takes place regularly in cattle, whereupon there develops the characteristic lesions of blackleg in the masticatory muscles and the edema formation in their neighborhood. The fact that for the most part cattle of an age from one-half to 4 years old sicken, Steinbrück traces back to the penetration of the anaerobe into the defective mucous membrane arising from shedding of the teeth. The same is true of foot-and-mouth

disease. In the beginning of gas gangrene and blackleg the body temperature is frequently normal. Fever does not always occur in the beginning as is asserted. Vaccination with "gas edema serum Höchst" has stood the test in the field.

L. T. GILTNER.

EXPERIMENTS WITH QUARTZLIGHT TREATMENT IN SKIN DISEASES OF THE DOMESTIC ANIMALS. D. Wirth. Monatsh. Prakt. Tierheilk., May, 1919, p. 554.

The author summarize his experiments as follows:

With correct application quartzlight exerts a favorable action on the skin diseases of the domestic animals. Since the skin of animals (horse and dog) is less susceptible to the quartzlight than the skin of man, the intensity of the rays, i. e., distance and duration, must be greater with animals than with man. For the lightest treatment a distance of about 30 cm. and a duration of about 15 minutes is considered sufficient.

Favorable results were obtained in cases of acute and chronic eczema of both moist and dry character, in acne, and in suppurating-*Trichophyton* infection. A case of dermatitis induced by drugs was favorably influenced.

Severe cases of acarus, acanthosis nigricans and seborrhea in the dog as well as mange in the horse were not influenced in a therapeutic sense by the quartzlight treatment.

This treatment is to be recommended in all cases in which it is desired to bring about a disappearance of connective tissue like thickenings of the skin caused by severe infiltration. It is particularly valuable in cases in which medicinal treatment has been of no avail. The combination of the quartzlight treatment with the external application of medicine has given favorable results. The marked hyperemia caused by the quartzlight aids in the absorption of the medicine.

The eyes of dogs showed no visible effect from the direct action of the treatment applied for several minutes.

Sarcoptic mange mites were killed after treatment with the light for 50 minutes. Dermatocoptic mites remained alive after a 2-hour treatment.

L. T. GILTNER.

REVIEW

LES TUBERCULOSES ANIMALES (ANIMAL TUBERCULOSIS). By H. Vallée, Director of the Veterinary School at Alfort, and L. Panisset, Professor of the Veterinary School at Lyons. One-volume of 528 pages, with 8 colored plates. Octave Doin and Brothers, publishers, Paris, France. Price 14 francs.

Appearing as one of a collection of 25 volumes upon the subject of tuberculosis, which is being prepared by Chantemesse, Poncet and Collet, of France, is a most comprehensive and complete treatise upon the subject of tuberculosis among animals, prepared by Vallée and Panisset. In the production of this work the authors have made a thorough study of the writings of earlier investigators, and the bibliographic index which is included in their treatise is one of the many valuable features of the book. It is gratifying to note that the names and writings of American investigators are given a prominent place in the discussion of the various phases of animal tuberculosis. Extracts from the conclusions reached by such writers as Theobald Smith, Leonard Pearson, Park and Krumwiede, M. P. Ravenel, V. A. Moore, and several scientists engaged in research for the Bureau of Animal Industry, appear with pleasing frequency throughout the entire work.

Questions that have led to heated discussions in years past are treated fairly by the writers and at suitable length, but in no instance are they drawn out in tiresome detail.

The chapter on diagnosis is in itself a work of the greatest interest and value. In it the preparation, application and effectiveness of tuberculin, by the different methods of testing, are described fully and in an interesting and convincing manner.

The chapters on immunization and prophylaxis are of great practical value at the present time when such determined efforts are being made by stock owners to establish herds that are tuberculosis-free. No attempt is made to minimize the persistent effort that is necessary to eradicate tuberculosis from an infected herd, but where all modern means of fighting the diseases are faithfully utilized the prospects of finally gaining a healthy herd have not been more promising in many years. Considerable emphasis is justly placed upon the value of the education of stock owners. Convincing them of the danger that threatens where tuberculous animals are carelessly purchased and placed with sound stock, or in case tuberculous cattle or hogs are allowed to remain in herds that are otherwise healthy, is a positive step in advance toward reaching the desired goal.

H. J. W.

ARMY VETERINARY SERVICE

NEWS FROM THE SURGEON GENERAL'S OFFICE

THE following orders of transfer and reassignment have been issued for veterinary officers:

Major A. E. Donovan, U. S. A., from Chicago, Ill., to Camp Funston, Kan., as Division Veterinarian, 7th Division.

Major C. B. Perkins, U. S. A., from 2d Division, Camp Travis, Texas, to Remount Depot, Camp Travis, Texas, for duty.

Major J. R. Jefferis, U. S. A., from Remount Depot, Fort Keogh, Mont., to Boise Barracks, Idaho, for duty as Purchasing Zone Veterinarian.

Capt. G. W. Brower, V. C., from Chicago, Ill., to Camp Fort Bliss, Texas, as Camp Veterinarian.

Capt. W. C. Griffin, V. C., from Fort Bliss, Texas, to Chicago, Ill., for instruction in meat inspection.

Capt. P. M. Hudgins, V. C., from Camp Pike, Ark., to Boise, Idaho, for duty with Remount Purchasing Board.

Capt. C. C. Whitney, V. C., from Fort Sam Houston, Texas, to Washington, D. C., for duty with the Army Veterinary Laboratory at the Army Medical School.

Capt. J. A. McKinnon, V. C., who recently returned from acting as Chief Veterinarian, A. E. F., Siberia, to Camp Lewis, Wash., as Camp Veterinarian.

Capt. J. H. Drayer, V. C., from Fort Ethan Allen, Vt., to Remount Depot, Camp Dodge, Iowa, for duty as the Veterinarian.

Capt. H. Z. Homer, V. C., from Chicago, Ill., to Camp Grant, Ill., for duty with 6th Division.

Capt. V. B. Wright, V. C., from Chicago, Ill., to Camp Funston, Kan., for duty with the 7th Division.

Capt. C. Nockolds, V. C., from 7th Division, Camp Funston, Kan., to 2d Division, Camp Travis, for duty as Division Veterinarian.

THE ARMY REORGANIZATION BILL

THE Army Reorganization Bill, signed by the President June 4, 1920, has the following provisions of interest to veterinarians in its application to the Veterinary Corps:

"The number of officers with the Veterinary Corps shall be 175.
* * * An officer of the Veterinary Corps shall be promoted to

the grade of First Lieutenant after three years' service, to the grade of Captain after seven years' service, to the grade of Major after fourteen years' service, to the grade of Lieutenant-Colonel after twenty years' service, and to the grade of Colonel after twenty-six years' service. * * * For purposes of promotion there shall be credited * * * to officers of the Veterinary Corps, their governmental veterinary service rendered prior to June 3, 1916."

"Filling of vacancy: Not less than one-half of the total number of vacancies caused by this Act, exclusive of those in the Medical Department * * * shall be filled by the appointment, to date from July 1, 1920, * * * of persons other than officers of the Regular Army who served as officers of the United States Army at any time between April 6, 1917, and the date of the passage of this Act. * * * No such person * * * shall be appointed * * * above the age of 58 years in a noncombatant branch. No such person below the age of 48 years shall be appointed in the grade of Colonel, or below the age of 45 years in the grade of Lieutenant-Colonel, or below the age of 36 years in the grade of Major. * * * Provided, that no officer shall be appointed in any branch of the service * * * except with the approval of the chief of such branch or officer acting as such."

"Promotion of officers: * * * Existing laws providing for the examination of officers for promotion are hereby repealed, except those relating to physical examination, which shall continue to be required for promotion to all grades below that of Brigadier-General, and except also those governing the examination of officers of the Medical, Dental, and Veterinary Corps. Officers of said three corps shall be examined in accordance with laws governing examination of officers of the Medical Corps, Second Lieutenants of the Veterinary Corps being subject to the same provisions as First Lieutenants."

"Appointment of officers: * * * Appointments * * * shall be made * * * in the Veterinary Corps in the grade of Second Lieutenant from reserve veterinary officers between the ages of 21 and 30 years."

"Officers' Reserve Corps: * * * Appointment in every case shall be for a period of 5 years. * * * The President may order reserve officers to active duty at any time and for any period; but except in time of a national emergency, expressly declared by Congress, no reserve officer shall be employed on active duty for more than 15 days in any calendar year without his own consent."

Provision is also made for the establishment of a Reserve Officers' Training Corps in civil educational institutions, to consist, in the case of such organization as the Veterinary Corps, of not less than 50 students. Veterinary students admitted to the Veterinary Corps unit for a course of training at the rate of 90 hours of instruction per annum for four collegiate years, if selected by the professor

of military science and tactics and the head of the institution at the end of two years of such training, on agreement to continue in the R. O. T. C. for the remainder of his course and agreement to pursue the course in camp training, may be furnished by the United States with commutation not exceeding the cost of the garrison ration prescribed for the Army, for the remainder of his service in the R. O. T. C., not exceeding two years.

"The Secretary of War is hereby authorized, in his discretion, to detail not to exceed two per cent of the commissioned officers of the Regular Army in any fiscal year as students at such technical, professional, and other educational institutions, or as students, observers, or investigators at such industrial plants, hospitals, and other places, as shall be best suited to enable such officers to acquire a knowledge of or experience in the specialties in which it is deemed necessary that such officers shall perfect themselves. The number of officers so detailed shall, as far as practicable, be distributed proportionately among the various branches."

At the present time the Veterinary Corps has about half of its allotted quota of 175 veterinary officers, leaving about an equal number of vacancies to be filled. It is contemplated that 125 to 150 officers will be enrolled in the Reserve Corps. Provision is made to appoint veterinary officers from the reserve list, which includes only men who were in service during the war, in the various grades, the age limit which applies to the regular officers applying also in the case of these appointments. Such an appointment to any given grade automatically carries with it the number of years of service necessary for appointment to that grade as a basis for future promotions.

This bill marks a distinct improvement in the status of the veterinary officers as compared with the National Defense Act of June 3, 1916, which provided for 118 veterinary officers to rank from Second Lieutenant to the grade of Major after twenty years' service. While it can not be regarded as a final word in legislation for the Veterinary Corps, it is a substantial advance in status which should lead to distinctly increased efficiency and to a much more satisfactory environment for veterinary officers. Undoubtedly the veterinary profession will benefit by this recognition.

M. C. H.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Report of Committee on Necrology, 1918-1919

*(Presented at the Fifty-sixth Annual Meeting of the Association,
New Orleans, La., November 21, 1919)*

THE information collected from several sources, namely, from the record cards of the Secretary's office, letters from the resident secretaries and secretaries of State and district associations, and from the veterinary journals, shows that not less than 145 veterinarians who were residents of the United States or of Canada have died during the year 1918-1919. The list of names is submitted herewith. Of this number 52 were reported as members of the American Veterinary Medical Association. A fuller investigation of the list by aid of the records of the Secretary's office will no doubt show that the names of many other members of the A. V. M. A. are included in the death roll.

All the information which it was possible to collect in the limited time has been sent to the office of the Secretary, for his use in checking up the records and as an aid toward securing fuller biographical data.

The incomplete supplementary list has been tabulated by States, and it is the desire of the committee that this list be looked over by one or more members from the different States, in attendance at this meeting, and that any missing data needed for the Secretary's records may be supplied.

The number and large percentage of deaths among the veterinary profession during the past year is probably unprecedented and is no doubt due in great measure to the influenza epidemic which prevailed during the latter part of 1918 and the early part of 1919. In the cases where the cause of death is given it is noticeable that "influenza and pneumonia" are mentioned most frequently.

The committee intended to give tabulations showing the losses sustained by the alumni of the several veterinary schools and the number who were connected with official work in the Federal Bureau of Animal Industry and in the State and Provincial service, as well as the number engaged in military service, but the information obtained was not sufficiently complete.

We regret that it is impossible to present a fitting biographical sketch herewith of the many deceased veterinarians whose services deserve more than a passing mention. Lack of time and space will not permit of this. Such biographical materials as we have been able to collect have been filed with the Secretary, and any important facts which have not already been printed in the journals will appear in future issues.

In such a large number of names it is to be expected that a few will stand out with somewhat greater prominence than others, and we are sure that it will not be regarded by anyone as an invidious distinction if we single out for special mention the names of two veterinarians, Samuel H. Ward of Minnesota and Major Harry D. Gill of New York, both of whom were members of the Association for many years and gave unstinted service for the advancement of the profession. A meed of praise is also due to Maximilian Herzog, a member of the medical profession who has done worthy work for the advancement of veterinary science. Nor should we overlook the passing of two laymen of distinguished attainments and service in the fields of education, statecraft and agriculture, whose large vision and powerful patronage have been of inestimable value to our profession, the Honorables Andrew Dickson White of New York and ex-Governor W. D. Hoard of Wisconsin.

If anyone present desires to supplement the report of the committee by a brief tribute to the men whose names have just been mentioned, or to any member of the Association who has passed away during the year, that privilege is accorded by the committee and we are sure will be granted by the Association.

J. W. CONNAWAY, *Chairman.*

ALPHABETICAL LIST OF DECEASED MEMBERS

(1 denotes Army service; 2, city or State service; 3, Bureau of Animal Industry.)

Bear, Harry H., Mountjoy, Pa.; Am. Vet. Col., 1893; A. V. M. A. 1913; died February 27, 1919.

Bird, Robert H., Greeley, Colo.; Royal Vet. Col., Edinburgh, Scotland; A. V. M. A. 1895; died October 26, 1919; age 65.

Burnham, Frank E. (2), Superior, Wis.; Chi. Vet. Col., 1890; A. V. M. A. 1899; died February 17, 1919; age 59; city veterinarian; deputy State veterinarian.

Brassard, George J., Ashland, Wis.; Ont. Vet. Col., 1895; A. V. M. A. 1910; died February 5, 1918.

Buchanan, Henry, Thomasville, Ont.; Detroit Col. Med., Vet. Dept., 1895; A. V. M. A. 1916; died 1919.

Campbell, William, Enosburg Falls, Vt.; U. S. Col. V. S. 1917; A. V. M. A. 1917; died October 21, 1918; age 36.

Carroll, 1st Lieut. Thomas B. (1, 2), Wilmington, N. C.; Univ. of Balt., 1891; A. V. M. A. 1908; died November 10, 1918; age 50.

Coppess, S. A., Waterville, Wash.; Ohio Vet. Col. (Cin.), 1892; A. V. M. A. 1916; died September, 1918, age 51.

Colson, Charles S. (3), Chicago, Ill.; McKillip Vet. Col., 1905; A. V. M. A. 1918; died July 2, 1919; age 40.

Debold, W. O. (3), Chicago, Ill.; Cin. Vet. Col., 1913; A. V. M. A. 1918; died August 10, 1919.

Fraser, Hunter (3), Tyler, Tex.; died October 16, 1918.

Gill, Major Harry D. (1, 2), New York, N. Y.; N. Y. Col. V. S., 1884; A. V. M. A. 1888; died October 3, 1918; age 57.

Gordon, C. C., Richmond, Ill.; McKillip Vet. Col., 1914; A. V. M. A. 1917; died March 8, 1918; age 26.

Greer, Henry A. (2), Danville, Ill.; Chi. Vet. Col., 1906; A. V. M. A. 1917; died December 27, 1918; age 38.

Hanson, Peter (2), Pullman, Wash.; S. F. Vet. Col., 1909; A. V. M. A. 1916; died December 19, 1918; age 35.

Highway, J. G., Ladoga, Ind.; died February 18, 1919; age 55.

Herzog, Maximilian Joseph, M. D., Chicago, Ill.; Ohio Med., Cin.; honorary member A. V. M. A.; died August 9, 1918.

Hoard, Hon. W. D. (2), Fort Atkinson, Wis.; honorary member A. V. M. A., 1909; died November 21, 1919.

Johnson, Oscar J., Miles City, Mont.; Ohio St. Univ., 1911; A. V. M. A. 1913; died November 12, 1918; age 30.

Kendall, S. Paul, Wood River, Ill.; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 2, 1918; age 28.

Kraemer, Lieut. W. C. (1), Sunbury, Pa.; Univ. of Pa., 1916; A. V. M. A. 1916; died in France, 1919; age 28.

Lee, Jephtha D. (1), Menomonie, Wis.; Ont. Vet. Col., 1907; A. V. M. A. 1916; died March 1, 1919; age 41.

Lewis, James, Greenwood, Miss.; Chi. Vet. Col., 1903; A. V. M. A. 1909; died January 11, 1919.

Luzador, Roy A., Morrisonville, Ill.; Chi. Vet. Col., 1910; A. V. M. A. 1911; died October 21, 1918.

McCushing, Lieut. F. P. (1), Keene, N. H.; Univ. of Pa., 1907; A. V. M. A. 1908; died January 5, 1919; age 34.

Millard, Hugh R., Cheyenne, Wyo.; N. Y. State Vet. Col. (Cornell), 1911; A. V. M. A. 1912; died November 25, 1918; age 29.

Milligan, Stephen C. (3), East St. Louis, Ill.; McKillip Vet. Col., 1910; A. V. M. A. 1918; died September 26, 1918; age 36.

Misner, Lieut. Harvey C. (1), Terre Haute, Ind.; Terre Haute Vet. Col., 1912; A. V. M. A. 1918.

Morgan, William J., Seaton, Ill.; Chi. Vet. Col., 1906; A. V. M. A. 1912; died July 15, 1919.

Munsell, W. A., Green Cove Springs, Fla.; N. Y. State Vet. Col. (Cornell); died October 24, 1918.

Nattress, Joseph T., Delavan, Ill.; Ont. Vet. Col., 1885; A. V. M. A. 1904; died March 19, 1919.

Neal, Chester C., Glenolden, Pa., Univ. of Pa., 1916; A. V. M. A. 1918; died 1918.

Nichols, Walter S., Ravenna, Nebr.; Ont. Vet. Col., 1910; A. V. M. A. 1917; died October, 1918; age 36.

Orme, T. W., San Bernardino, Calif.; A. V. M. A. 1913.

Paley, Lieut. Israel (1), New York, N. Y.; Chi. Vet. Col., 1917; A. V. M. A. 1918; died October 16, 1918; age 28.

Palmer, Clinton B., Easton, Pa.; Chi. Vet. Col., 1911; A. V. M. A. 1913; died October 19, 1918; age 40.

Park, R. W., Dauphin, Manitoba; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 6, 1918.

Potts, 2d Lieut. F. E. (1), Sheboygan, Wis.; Grand Rapids Vet. Col., 1917; A. V. M. A. 1918; died 1919; age 27.

Rabin, Nathan W. (1), Pontiac, Ill.; Chi. Vet. Col., 1915; A. V. M. A. 1918; died November 3, 1918.

Reichmann, F. A., Geddes, S. Dak.; Chi. Vet. Col., 1910; A. V. M. A. 1912; died August 2, 1919.

Schopmeyer, 2d Lieut. A. C. (1), Poland, Ind.; Ind. Vet. Col. 1917; A. V. M. A. 1918.

Seright, William H. (3), Pleasanton, Kans.; K. C. Vet. Col.; A. V. M. A. 1917; died December 15, 1918; age 39.

Shaw, William G., Knoxville, Tenn.; Univ. of Pa., 1897; member A. V. M. A.; died April 23, 1919.

Stickel, William E., Etna Mills, Calif.; S. F. Vet. Col., 1913; A. V. M. A. 1915; died December 7, 1918.

Taylor, T. W., Macomb, Ill.; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 30, 1918; age 39.

Thompson, R. E. (2, 3), Tacoma, Wash.; Ohio St. Vet. Col., 1908; A. V. M. A. 1917; died April 14, 1918; age 34.

Treadway, Charles R., Canton, Mo.; K. C. Vet. Col., 1905; A. V. M. A. 1909.

Ward, S. H. (2), St. Paul, Minn.; Ont. Vet. Col., 1894; A. V. M. A. 1898; died December 13, 1918.

Wicks, A. G., Schenectady, N. Y.; Ont. Vet. Col., 1888; A. V. M. A. 1894; died March 9, 1919.

Wood, E. P., Charlottesville, Va.; U. S. Col. V. S., 1908; A. V. M. A. 1915; died December 22, 1918.

Wright, David E., Colfax, Colo.; N. Y. State Vet. Col. (Cornell), 1912; A. V. M. A. 1916; died March 28, 1919; age 27.

SUPPLEMENTARY LIST OF DECEASED VETERINARIANS

Alabama—D. A. Holmes, Dadeville.

Arkansas—Charles S. Aldrich, Forrest City.

California—H. E. Nelson, Laton; L. C. Kenyon, Merced; Ward B. Rowland, Pasadena.

Colorado—Fred W. Culver, Longmont; Thomas N. Slayton, Greeley.

Delaware—John W. Tigner, Dover.

Georgia—W. W. Parrish, Fitzgerald.

Illinois—Henry W. Asche, Manlius; Thomas H. Atherton, Yorkville; D. R. Benjamin, Leroy; J. D. Durack, Geneseo; F. C. Grayson, Paxton; Volney G. Hunt, Arcola; A. L. Sederholm, Moline; Harry C. Whiteside, Eddyville.

Iowa—Dr. Breezley, Essex; Charles Blakely, Corydon; J. J. Carter, Bermond; William Ellery, Anderson; A. P. Jones, Martinsburg; Lester Jones, Sutherland; Lieut. E. R. Hites, Des Moines; Thomas Thompson, Rowan; G. E. Ureham, Atlantic.

Indiana—Nelson Stone, Huntington; L. E. Winn, Auburn; G. R. Wright, Cottage Grove.

Kansas—Phil. F. Simmons, Cottonwood Falls.

Maine—Fred W. Huntington, Portland.

• *Maryland*—Michael Thomas Griffin, Jr., Baltimore.

Massachusetts—David DuBois Allen; Walter P. Mayo, Framingham; C. H. Perry, Worcester.

Michigan—Thomas Bell, Frontier; J. W. Hefferman, Pinckney; D. J. Lamoureux, East Lansing; Wallace McQueen, Oxford; Charles A. Waldron, Tecumseh (member State Board of Examiners).

Missouri—T. W. Churchill, St. Louis; William Cooper, Kansas City; J. R. Jerome, Mountain Grove; J. S. Martin, Monroe City; J. J. Pendergast, St. Louis (formerly city veterinarian).

Mississippi—George A. Love, Brookhaven.

Manitoba—Hubert D. Lawson, Newdale; Dr. Reid.

Nebraska—J. S. Vinnedge, Ord.

New York—W. W. Andrew; William F. Braested, Brooklyn; Saul S. Brooks; David W. Clark, Walton; Jonathan H. Conover; Hugh F. Davis, New York City; Edw. S. Doyle; George W. Gilbert, Bayport, L. I.; William P. Hannifen; W. W. Herron, Sherman; Max Hartvigson, New York City; W. J. Johnston, Geneva; John S. Lamkin; Lewis Sheridan Matthews, Cooperstown; Nathan Peyser, Corona, L. I.; Rudolph Plageman, Brooklyn; J. L. Rowan, Corning; Edw. C. Ross, New Haven, Conn.; Robert J. Twitty, Buffalo; George A. Waters, Brooklyn; F. H. Warner, New York City.

North Dakota—G. W. Reimche, Lincoln Valley.

Ohio—Edgar L. Burke, Worthington; William J. Classen, Cleveland; Ayriel Greenough, Cleveland; Lieut. Edw. J. Snyder; Ralph A. Wilcox, Xenia.

Pennsylvania—John C. Brackbill, Lancaster; P. L. McBreen, New Kensington; George Nichols, New Kensington; William H. Seitzinger, Wernersville; J. H. Timberman, Wilkes-Barre; Thomas M. Waldron, Uniontown.

South Dakota—B. B. Bassett, Gettysburg; C. S. Walkup, Pipestone.

Texas—W. A. Skinner, Fort Worth.

Washington—Leroy L. Shaw, Dayton; R. E. Thomson, Tacoma.

Wisconsin—Harry Snyder, Montfort; Charles Woodford, Portage.

Wyoming—H. R. Bernard, Upton.

Section on College Faculties and State Examining Boards

THE College Faculties and State Examining Boards Section of the American Veterinary Medical Association met in connection with the fifty-sixth annual meeting of the Association at New Orleans, La., November 20, 1919.

The meeting was called to order by President R. C. Moore. Owing to the fact that there were many things of importance to be brought before the general session, it was moved, seconded and carried that the papers of this division be read by title only and that they be submitted to the General Secretary of the Association for publication.

There being no report of committees, a motion was made to proceed with the election. Carried. Dr. Reuben Hilty was nominated for President and elected by unanimous ballot. Dr. H. S. Murphey was nominated for Secretary and elected by unanimous ballot.

President Moore made a short address urging the closer co-operation of the various State examining boards and college faculties with a view of establishing uniformity in examinations by the State boards and more uniform courses in the veterinary colleges. He also urged that faculty members and members of State examining boards interest themselves with a view of establishing this closer coöperation.

There being no further business, the meeting adjourned.

ROBT. D. WALL, *Secretary*.

Hurdling a drainage ditch with the assistance of Henry Ford, walking seven miles to town after the breakdown of a less popular car, being hauled out of a "gumbo" hole by a team of mules following a cloudburst, and sleeping all night on one's elbow in a day coach to keep to the schedule, were a few of the experiences which befell the editor during a recent trip through Arkansas, Texas and Oklahoma.

Drs. Hecker and Baker, who are conducting a large practice at Houston, Texas, report an ever-increasing demand for their services in the adjacent counties, particularly in connection with vaccination against hog cholera, anthrax and blackleg.

Dr. J. T. Dungan, of Cushing, Okla., is so fully occupied with his growing practice that he has not had time to give any consideration to the newly developed oil field almost in front of his hospital.



The above is a view from the roof of the Huntington Bank Building, Columbus, Ohio. This building is almost adjacent to the Hotel Deshler, the headquarters for the A. V. M. A. meeting August 23-27 inclusive. Memorial Hall, where the sessions and exhibits are to be held, shown to the left, is three squares out East Broad Street from the Hotel. The State House occupies the center of the view.

OTHER ASSOCIATIONS

ONTARIO VETERINARY COLLEGE GRADUATING EXERCISES

THE closing exercises of the graduating class of 1920 were held in the assembly hall of the Ontario Veterinary College on Thursday, April 29, 1920. Principal McGilvray occupied the chair, and the Hon. Manning W. Doherty addressed the graduating class, presented the diplomas and awarded the prizes. The other speakers were Malcolm McVicar, M. P. P.; Leslie W. Oke, M. P. P., and Dr. William Cowan. Among the visitors were Drs. Richmond, Otte-well, Buckley, Thompson, Dunn, Irvin and Mackie, and C. F. Bailey, managing director of the Royal Agricultural Winter Fair Association of Canada. There were also present the following members of the faculty: Drs. Addison, Batt, Nelson, Pringle, Campbell, Gwatkin and Weaver.

In his address Principal McGilvray expressed the hope that the graduating class would maintain high ideals and inculcate in their future work the knowledge and training acquired during their college course. While the increased use of motors had somewhat lessened horse traffic in the cities, there was nevertheless a great demand for good types of horses at good prices. Cattle, sheep and swine had likewise reached higher values than heretofore, which would likely continue for some time owing to the world shortage. The preservation and fostering of live-stock interests, therefore, became of national concern, as they constitute an important factor in the economic conditions, which can not be lightly sacrificed. Some skilled service must therefore be provided and maintained to safeguard the herds and flocks of the country against depletion from diseases, especially those which are preventable or of such a nature as may be communicable and endanger large numbers. The opportunity for rendering this service to the live-stock industry is open to the veterinary profession. To cope fully with the various demands the profession must maintain a high standard of efficiency in all its branches, and the benefit of preventive medicine should be advocated. Every veterinarian should endeavor to educate his clients on the various diseases of live stock which are preventable, and special emphasis should be placed on the value of preventive treatment against such diseases as blackleg and hemorrhagic septicemia of cattle, white scours of calves, and

joint ill of foals. More attention should be given to the control of tuberculosis, contagious abortion and sterility in cattle. Parasitic diseases, such as lung worms and stomach worms in sheep, can also be handled by the veterinarian with advantage to the owner. The losses from these maladies are undetermined, but they unquestionably reach an enormous aggregate sum which every one should endeavor to prevent or reduce as far as possible.

In concluding his address Dr. McGilvray referred to the great influence which the alumni of the College could wield for higher education and better standards of veterinary service. Additional encouragement was to be expected from the recent veterinary legislation, which the Honorable Manning W. Doherty and the other members of the Legislature had been instrumental in having enacted. Dr. McGilvray then introduced the graduating class to the Honorable Manning W. Doherty, the Minister of Agriculture for Ontario.

The Minister, in his address, stated that he had for many years taken a keen interest in the progress of veterinary science. Its problems also concerned him, as he was a breeder of live stock and fully realized the importance of skilled veterinary service for the treatment and prevention of animal diseases. The present occasion also gave him additional pleasure, as it brought back memories of his own student days at the Agricultural College. He extended to the faculty and students his best congratulations for the excellent showing of the various classes. He fully realized the enviable reputation enjoyed by the Ontario Veterinary College, and he exhorted each graduate to do everything in his power to carry on the good work and further raise the prestige and standard of the institution. It was not possible for any educational institution to give complete knowledge to its graduates, but the training received enabled them to increase further their knowledge and to make the best application of it in their life work. He appealed to the class to keep abreast of the times by reading the best veterinary and other scientific journals, and to contribute freely of their knowledge in order to get results and to bring added honors to their profession. The Department of Agriculture, over which he had the honor to preside, was deeply interested in the promotion and advancement of veterinary science in its relation to agriculture. The development of Canada was largely bound up in agriculture and our future would be influenced greatly by the further development of the livestock industry. In fact, it was becoming more fully realized that live stock is the sheet anchor of successful agriculture, by main-

taining the fertility of the soil. This is well exemplified in the case of England, which, although the soil has been under cultivation for centuries, still retains its fertility through the raising of live stock. While every good breeder of live stock recognizes the importance of having trained veterinarians in the community, yet it was felt that, in some respects at least, they were not wielding the influence they should. This was partly due to the fact that too many of them had confined their energies to diseases of the horse and neglected to become equally conversant with diseases of cattle, sheep and swine, and had failed to become judges of live stock. If the veterinary surgeon wished to succeed and to command the confidence of live-stock owners and breeders, he must become a reliable judge of live stock and thus be recognized as a real force and factor in live-stock development. In alluding to the recent Veterinary Science Practice Act, which had been enacted by the Legislature, Mr. Doherty hoped that it would improve the status of the profession in Ontario. With this came added responsibilities, and it should be the aim of the colleges to educate and train students so that, when they graduate, they may more adequately perform the services and render the leadership which the community may expect from them.

In presenting the diplomas and prizes Mr. Doherty referred to the large number in the class that he noticed were wearing the Military Service Button, and said that he realized more and more that men should not be judged by the amount of wealth which they accumulated but by the sacrifices which they had made and were prepared to make for their fellow men and the community at large.

Those receiving diplomas were W. D. Baskette, Mount Elgin, Ont.; R. J. Bowerman, Weyburn, Sask.; W. J. Drennan, Alliston, Ont.; E. G. Folsom, Mount Clemens, Mich.; A. G. Frew, Scotland, Ont.; J. L. Gleason, Lakeside, Ont.; J. S. Glover, Carstairs, Alta.; L. B. Jakes, Toronto, Ont.; R. G. Law, Toronto, Ont.; H. G. McDonald, Antigonish, N. S.; J. E. Nesbitt, Merivale, Ont.; G. E. Stanley, Holland Center, Ont.; L. E. Turner, Mono Road, Ont.

The prizes were awarded as follows: J. S. Glover and G. E. Stanley (equal), first prize; A. G. Frew, second prize; R. G. Law, third prize; L. E. Turner, honorable mention.

Mr. Malcolm McVicar, member of the Legislative Assembly for the constituency of East Elgin, then addressed the class. Mr. McVicar expressed a sincere interest in the welfare of the veterinary profession; especially in view of the fact that veterinary science

could render valuable service to the live-stock industry, which was one of the basic principles of successful agriculture and an integral part of the economic fabric of national growth and prosperity. He counseled the class to remain steadfast, for, although at times they might meet with adversity and discouragement, they should maintain the right attitude towards their profession, have a broad outlook, and success would be their reward.

Mr. Leslie W. Oke, member of the Legislative Assembly for East Lambton, stated that this was his first visit to the College, and he hoped to have a further opportunity of becoming conversant with its progress and usefulness. He felt that, with the determination manifested in the faces of the various members of the class, they would make good and bring credit to themselves and their Alma Mater. He advised them to be faithful to their profession, to be honest and do justice to their fellow men, and to overcome obstacles by renewed application and perseverance.

Dr. William Cowan of Galt, Ontario, who was on the Board of Examiners during the late Dr. Andrew Smith's time, next addressed the meeting. In the course of his remarks Dr. Cowan alluded to the origin of the College, through the influence of the late Honorable Adam Ferguson, one of the pioneers of agriculture in the Province of Ontario, and traced its growth and progress up to the present time. It was due to the efforts of Mr. Ferguson that Dr. Andrew Smith had been able to establish the Ontario Veterinary College. Dr. Cowan himself had long been closely identified with the profession in Ontario, and knew its problems. For forty years legislation for the regulation of veterinary practice had been a vexed question. It had been sought for from all shades of political parties, but it remained for what is popularly known as the "Farmers' Government" to place on the statutes more satisfactory veterinary legislation. He was, therefore, more hopeful than ever as to the future of the profession, and had no fears but that they would merit the confidence and recognition accorded.

Mr. George E. Stanley then presented to the College a mounted photograph of the graduation class. In making the presentation he stated that all of the class, with the exception of two members, had seen active service overseas during the late war, and had served in the front-line trenches with some of the best fighting units of Canada. On behalf of the class he extended to the principal and faculty their appreciation for much helpfulness and encouragement with their studies, and stated that they wished to record themselves

as being satisfied with the course of studies and training received at the College.

In responding, Dr. McGilvray expressed his appreciation of the kindly sentiments tendered the College by the different speakers and wished the graduating class of 1920 "Godspeed" and extended his sincerest hopes that their prosperity would continue throughout the future.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

THE regular monthly meeting of the Veterinary Medical Association of New York City was called to order in the lecture room of Carnegie Laboratory, 338 East 26th Street, Wednesday, May 5, at 8:30 p. m. The minutes of the April meeting were read and approved.

Prof. John F. DeVine, Goshen, N. Y., gave an interesting talk on "Balanced Rations." The Professor handled this important subject in his well-known style, and while not posing as an authority on the scientific feeding of dairy cattle, he gave some valuable information on the care, feeding and management of the purebred dairy cow. He stated that in his opinion the feeding and management counted fully 50 per cent in the production of a world's record cow. What he considered a good balanced ration consisted of 200 pounds wheat bran, 200 pounds hominy or corn meal, 200 pounds crushed oats, 100 pounds cottonseed meal, 100 pounds linseed meal, 1 per cent salt; with plenty of roughage, clover hay, roots, alfalfa and silage. That his talk was immensely appreciated by all those in attendance was evidenced by the active discussion and questions asked by a majority of the members.

Prof. Wilfred C. Lellman, M.D., D.V.S., New York City, presented a very able lecture dealing with his studies on animal psychology. He supplemented this with drawings of the central nervous system illustrating his theories. Owing to the lateness of the hour the Professor was unable to finish his lecture, but he promised to be present at the June meeting to resume it and to answer any questions that the members might wish to ask. The secretary was requested to write Dr. Blair, requesting him to be present at the June meeting if possible, in order to discuss Professor Lellman's lecture.

Dr. William J. McKinney, chairman of the Prosecuting Committee, reported that he had investigated the case of Miss Susanna Bell,

who was alleged to be practicing illegally. In his opinion no action should be taken. It was moved and seconded that Dr. McKinney's report be accepted and placed on file.

A vote of thanks was extended to Professor DeVine and Professor Lellman.

Meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary*.

HUDSON VALLEY VETERINARY MEDICAL ASSOCIATION

The Hudson Valley Veterinary Medical Association held a well attended meeting at Newburgh, New York, May 12. The discussion was confined to hog cholera and allied diseases and the preventive inoculation by use of anti-hog cholera serum and virus.

Dr. B. J. Cady, Federal inspector in charge of the coöperative hog cholera educational work in New York, and located at Ithaca, gave a very excellent talk and demonstration on the use of serum and virus from the practitioner's standpoint, explaining every detail of the technique and also the pitfalls met with in practice in diagnosing various forms of hog diseases.

Dr. A. Eichhorn, now Director of Lederle Serum Laboratories at Pearl River, New York, discussed immunization methods and cleared up some important points which were extremely interesting from an economic standpoint for veterinarians with mixed practices.

Dr. J. G. Wills, Chief Veterinarian of the New York State Department of Agriculture, spoke upon the rules and regulations relating to the reporting of outbreaks and handling virulent blood to be used for immunization.

The demonstration by Dr. Cady was conducted on two hogs at Dr. J. W. Fink's Veterinary Hospital Laboratories, where he showed a simple method of handling and securing animals for inoculation.

J. W. FINK.

At the fifty-seventh annual commencement of the Kansas State Agricultural College, held May 27, the degree of Doctor of Veterinary Medicine was conferred upon the following: E. S. Bacon, E. M. Berroth, R. F. Coffey, J. F. Erdley, S. Eriksen, H. B. Hickman, R. W. Hixson, S. R. Johnson, L. A. Magrath, I. T. Mock, W. J. Ritter, M. P. Schlaegel, G. M. Simpson, L. V. Skidmore, J. E. Stanton, B. L. Taylor, B. B. White.

MISCELLANEOUS

IMPORTANT NOTICE

Secretary Mayo has written this office as follows:

"I am inclosing with this letter a list of 530 members of the A. V. M. A. who have not paid their dues for the current year. It is my understanding that their copies of the JOURNAL should be stopped. Three notices have been sent to all of them."

This means that one out of every eight members of our Association is delinquent, which to say the least is rather surprising. We feel that most of the delinquents have mislaid or neglected the notices of the Secretary, but under the regulations of the Post Office Department this will be the last number of the JOURNAL mailed them unless we are notified by the Secretary that their dues have been paid. Much extra and unnecessary work falls upon the Secretary because of the failure of members to acknowledge the first or at least second call for dues, and the expense to the Association of reinstating a delinquent is equivalent to that of installing a new member. If you are in doubt as to your present standing, Secretary Mayo will be glad to furnish you the information upon request. If the JOURNAL ceases to arrive at your office, remember "there's a reason."

NEW VETERINARY BARN AT THE UNIVERSITY OF MINNESOTA

A REAL hospital for veterinary clinical experiments and the care of farm live stock was recently finished and occupied at University Farm, Minn. Dr. C. P. Fitch, chief of the division of veterinary medicine of the University of Minnesota, says the new barn "has no equal in the United States, with no chance for an argument."

Owing to the rising costs, the new barn cost several thousand dollars more than was provided in the original appropriation by the legislature. It is 150 by 38 feet, with a vitrified clay block silo at the south end. There is a central driveway through the barn, with doors at each end and in the center at each side. All the doors are vestibuled, the better to maintain a uniform temperature for the animal patients within. The walls are constructed of hollow clay blocks and are 12 inches thick. On the outside the walls have two coats of Portland cement and a coat of stucco. The lower half



New veterinary barn, University Farm, Minn.



Interior view of Minnesota veterinary barn

of the walls inside are of white enameled tiling, while the upper half is plastered with Portland cement. Tiling facilitates cleaning and its use is held to be justified economically.

Ample sunlight for sick stock is admitted by 11 windows on either side of the building. Ventilation is provided by 11 intakes on either side, located between the windows near the ceiling, and four staggered outtakes arranged alternately one on either side of the central driveway.

Hudson barn equipment is used. There are 12 separate calf pens and 22 stanchions, 11 on either side in the south half of the barn. The calf pens are separated by concrete partitions and each pen has an individual drain or else connects directly with a drain in the alley. The floors are concrete throughout, with corked brick in the stanchions.

The ceiling is especially well insulated with tar paper and lath, flax keyboard linum, and a heavy coat of Portland cement on the surface. The hay chute is in the center of the barn and is insulated from the lower part by a long trough which fits flush with its edges and serves as a conveyance for the hay when lowered. The grain is kept in four bins in the loft, two on either side in the form of a double bin. These double bins connect with a single feed chute, one on each side of the drive. The barn is supplied with hot and cold water and electric lights.

THE PROFESSION HONORED

AT the recent commencement of Iowa State College of Agriculture and Mechanic Arts at Ames, Iowa, June 9, the honorary degree of Doctor of Science was conferred upon our Editor. The degree was conferred by President Raymond A. Pearson in the following words:

"John Robbins Mohler, graduate of the University of Pennsylvania, Chief of the Bureau of Animal Industry, United States Department of Agriculture, scientist, investigator, administrator, eminent veterinarian, director of the work of more than five thousand Government employes, leader in the eradication of animal diseases;

"By virtue of authority vested in me, and upon the unanimous recommendation of the Faculty of this College and with approval by the State Board of Education, I confer upon you the degree Doctor of Science, with all the rights and privileges thereto appertaining, here and elsewhere."

It will be recalled that Dr. Marion Dorset, Chief of the Biochemic Division of the Bureau of Animal Industry, received the honorary degree of Doctor of Veterinary Medicine from the same institution in 1915, in recognition of his research work on animal diseases, especially in connection with hog cholera.

C. H. S.

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No. 5

ON TO COLUMBUS

THE Fifty-seventh Annual Meeting of the American Veterinary Medical Association, to be held at Columbus, Ohio, August 23 to 27, will be worth while to every veterinarian in the United States and Canada who can possibly attend. Those who have been to these conventions in past years will need no urging. These annual gatherings are occasions for renewing old friendships and forming new ones, for cultivating a fraternal spirit and developing a professional consciousness, for planning and striving for higher attainments and ideals. They afford opportunities for enlarging one's store of knowledge and keeping abreast of scientific progress and its application in practice, as well as for refreshing body and mind by escaping from the daily round and enjoying a brief period of recreation amid new scenes. In short, they combine school with vacation, service with recreation, business with pleasure.

Practitioners make up much the largest part of the profession, and their needs and interests have been kept especially in view by President Cary and Secretary Mayo in planning for the Columbus convention, as will be seen by consulting the program which appears on another page. At the same time the sanitarians, the research

workers, the specialists, the educators and the Army veterinarians will find features to interest and benefit them.

For more than half a century the American Veterinary Medical Association has been the chief agency in bringing the veterinary profession to the standing and recognition that it now enjoys. It is the main hope and reliance for future progress in that regard. It offers substantial benefits to the veterinarians of America, and in turn it deserves their support. At the coming meeting questions of policy will arise to call for wise solution. It is the duty and the privilege of members to have a part in dealing with these problems. Every veterinarian who is eligible to membership in the Association should avail himself of that professional distinction. Those who are not members, however, are none the less welcome to attend the sessions and enjoy the program, short of participating in the actual business of the Association. The convention is for the whole profession.

Not the least among the advantages of attending conventions are the pleasure and the broadening influence of travel. It is a good thing for us occasionally to visit other sections than our own and to make the acquaintance of their people. A broad outlook and a spirit of national unity and international comity are thus fostered.

Last year we enjoyed the delightful hospitality of that quaint and charming old southern city, New Orleans. Those who were there will recall the eloquent gentleman who in the closing hours besought us to hold our next annual meeting in the beautiful capital of Ohio, whose glories and attractions he depicted in such alluring terms that we accepted at once. Impatient to realize the good things in store for us, and unwilling to wait a full year for the next meeting, we even shortened the interval to nine months. In the meantime Ohio has taken on still greater importance in the eyes of the world and promises to be a center of unusual interest for the next few months.

The profession in Ohio and the citizens of Columbus stand ready to redeem the promises made in their behalf at New Orleans. They are waiting for us to come in and possess their fair city. They want us to come in greater numbers than ever before. And we are asked particularly to bring the ladies, for whom special features of entertainment are being provided. The hour of realization approaches.

Let's go!

VETERINARY RECONSTRUCTION

WE have passed through so much in the last four years that conditions of every kind are new. Things commercial, things professional, things educational present strange aspects; and the strangeness in such matters creates uneasiness. Peace came twenty-one months ago, and peace means reconstruction. In turn, reconstruction means the largest problem this country has known in many a year. Many kinds of dislocations are to be righted and many new policies adopted. We are living now in a new world and have to adjust our affairs to new requirements. Beginners are not the only ones who stand in need of study and counsel. Many of us are full of curiosity about existing conditions and in not a little doubt about what should be done. We are pathmaking along with the novices, as experience is not the guide it formerly was. In this present period of revolution and evolution it behooves us to reason logically and act circumspectly.

To the fundamental principle involved in veterinary reconstruction in this country is based on the future status of veterinary education. This fact has been strongly presented in reviewing the psychological data obtained by the War Department in measuring and utilizing the brain power in the Army, published in *Science* of March 14, 1919. A comparison of the mental test measurements of officers in the various military groups shows that our military colleagues occupied an inferior position as revealed by psychological examining, while the engineers and field artillery officers were first and second respectively. In the January 17, 1919, number of *Science* the results are given of a standard examination for intelligence of 1,700,000 soldiers. The medium scores for recruits from different civil occupations are summarized, and again the mentality of the veterinarian is presented in an unenviable light. These tests speak for themselves and show conclusively that the A. V. M. A. has not been too urgent in its requirements for higher matriculation standards and a longer course of study.

With these facts before us, we will discuss briefly and from a reconstructive viewpoint the status of veterinary education during and after the war.

The progress of veterinary education in the United States was impeded to a considerable extent by the great world war. This was due to various causes which will be considered more in detail. To fill the ranks of the Veterinary Corps of the Army a large number of veterinary graduates were taken from civil life, because

the veterinary personnel of the Army, previous to the time the United States entered the conflict, was small in number and deficient in supplies. The new Corps was made up largely of drafted men and those who entered the service by enlistment. The effect of this method of obtaining a Corps was to deprive the general public of local practitioners, and many locations were left without expert advice in regard to diseases of live stock. Many vacancies occurred also in the veterinary service of the Bureau of Animal Industry. The supply of veterinarians available from civil-service registers to fill these vacancies was limited, and in order to continue the work of the Bureau, especially in meat inspection, it was necessary to make appointments for temporary periods. In many cases the men so appointed were not eligible by reason of their age for permanent appointment, but were efficient to supply the needs in the emergency.

The effect of the war conditions was further seen in the attendance of students at veterinary colleges. In common with other educational institutions the attendance of students decreased materially and the faculty was depleted as well as the student body. One institution reported that on account of war enlistments it had lost 50 per cent of its faculty and 66 per cent of its students.

It was considered advisable to create an Enlisted Medical Reserve Corps in order that the supply of graduate veterinarians should not cease and in order to provide capable veterinary officers for the Army. The plan of the E. M. R. C. was one by which a veterinary student could enlist and then be returned to the college where he had matriculated previously and complete his course of study, provided his progress was satisfactory and the conditions for veterinary training at the college selected were adequate. He, however, was subject to call to active duty at any time if the need for his services was urgent. This Corps was under the supervision of the Surgeon General of the Army and included also medical and dental students and hospital internes. By a ruling of the Surgeon General's Office all veterinary students in the E. M. R. C. who had been absent from college by reason of military service for more than two months were to be required to repeat the whole year, and it was planned that during vacations such students were to be ordered for temporary active duty at auxiliary remount depots. The veterinary students who were absent two months or less were to be allowed to complete their studies and after graduation were ordered to permanent active duty.

Under the supervision exercised by the Surgeon General it was

found that too many of the veterinarians employed by the Army were deficient in their basic education, and it was deemed expedient to inaugurate a plan by which future students should have a better preliminary education. It was therefore agreed that all "well recognized" veterinary colleges that desired to have their graduates eligible for positions either in the Bureau of Animal Industry or in the Veterinary Corps of the War Department should raise the entrance requirements to two years' high-school work or seven units. Evidence of this education was to be established by proper credentials, consisting of a certificate signed by the active superintendent or principal of an accredited high school, or, if the preliminary education of the student had been received in any other secondary school, the certificate must be signed by the State Commissioner of Education or other similar officer. This change affected particularly private veterinary colleges, for the reason that the veterinary colleges controlled by the States previously required high-school graduation or 14 units for entrance. The effect of this higher standard was to reduce still further the attendance of students. For this and other reasons five colleges discontinued their sessions and have not resumed them since the close of the war. One of the colleges which closed was the largest veterinary school in the United States. Several weeks ago two additional colleges announced that they would not reopen this fall.

Later, as another means of supplying educated men for the Army service, there was established a Students' Army Training Corps, the veterinary contingent of which was under the supervision of the Surgeon General of the Army. In pursuance of this plan it was suggested that all matriculants of veterinary colleges who were high-school graduates enroll at State veterinary colleges where they would be under military discipline as well as under veterinary instruction. This Corps did not begin its session until October 1, 1918, and as many veterinary students with high-school training already had entered private colleges about the middle of September, great confusion was caused by the transfer of these students. In two instances where two colleges were in operation in the same city an effort was made to combine the instruction and have it given at one institution only. This plan was not successful. The good results of the methods adopted were further impeded by the fact that the armistice was signed in November and the S. A. T. C. was disbanded the latter part of the year. Many of the students who had paid part of their tuition fees at private colleges and had begun

their studies there returned to the former institutions after the Corps disbanded. At the State colleges the situation was further complicated by the fact that barracks and facilities for Army instruction had been provided at great expense and these were of little value when the Corps was discontinued.

The students who were not high-school graduates remained at the private veterinary colleges for instruction during the fall and had completed part of their work when the change took place. This instruction had to be gone over a second time with a number of students who had made transfers, and in order that the curriculum might be completed a few of the colleges reorganized their classes, some beginning November 1 and some January 1. As the time of taking up different subjects is not the same at the different colleges—a lack of uniformity, by the way, which should be speedily corrected in this reconstructive period—it is reasonable to suppose that some work was repeated more than once and some omitted entirely. The situation was complicated again by the fact that, on account of the influenza epidemic, some of the colleges were closed during two or three weeks in October, 1918. The result is that the normal progress of veterinary instruction was interrupted and in many cases was abridged or omitted altogether. The students who composed the graduating classes were, many of them, those who failed to make satisfactory grades in previous semesters or were absent during a portion of the session on account of military service. Taking into consideration all these difficulties, it is seen readily that education was more or less deficient in some institutions during the war period.

In these reconstruction days it is evident that a change in the plan of veterinary education is needed. This is due mainly to the demand for the conservation of food in connection with the economic conditions brought on by the great war. Heretofore the emphasis has been placed on the ailments and diseases of horses and dogs, and not sufficient attention has been given to other animals; but under the new conditions a broader scope of instruction is necessary to include the ailments as well as the anatomy and physiology of cattle, sheep, swine and poultry. This instruction should relate not only to diseases but should embrace a general knowledge of animal husbandry and should cover the propagation, marketing and uses of all farm animals, their products and by-products, as well as the characteristics of each breed of live stock. The ability to identify the various breeds and types is essential to the veterinarian, who

should become a farmer's adviser and be able to instruct growers of live stock as to the best crops to be raised for fodder to provide properly balanced rations, and how to prevent diseases as well as how to cure them. The veterinarian is in reality an important factor in the agricultural development of the country, and should be qualified in its various branches, to fulfill the requirements of the lamented Pearson as an "animal engineer." Practical demonstration in the handling of these animals is also an important branch of study. On numerous occasions the agricultural press has indicated its interest in this broader training for the veterinarian, and a recent editorial in one of the leading stock papers urges veterinary schools to devote more and more attention to other than equine subjects.

When the position of veterinarian in the Bureau of Animal Industry was placed in the classified service the educational qualifications were fixed by the United States Civil Service Commission as the second-grade examination. This continued as the standard for more than 20 years and was incorporated in the Government regulations of the Secretary of Agriculture with the addition of geography and history of the United States and its possessions. In the fall of 1916, at the request of the Committee on Intelligence and Education of the American Veterinary Medical Association and by the coöperation of the Bureau of Animal Industry, the examination was changed to the first-grade examination, which was considered equivalent to graduation from grammar school.

When the War Department, through the Office of the Surgeon General, became interested in the employment of veterinarians, the educational standard was raised, with the hearty approval of the Bureau of Animal Industry and the A. V. M. A., to two years' high school of seven units or their equivalent.

It was recently announced that a further advance has been made and beginning with the fall of 1920 the Civil Service Commission will require for students who matriculate at that time four years' high-school education of at least 14 units, or their equivalent, for all accredited veterinary colleges. This is a distinct advancement in this line and places all accredited veterinary colleges, including State and private schools, on the basis of four years' high-school education.

Dr. Francisco M. Guillot has written the JOURNAL extending an invitation to those of his colleagues who want to see plenty of anthrax and Texas fever cases to pay a visit to Porto Rico.

OUR PROFESSIONAL POLICIES¹

By C. H. STANGE, Ames, Iowa

IF in the following paragraphs little is said about some of the many fine things that are being accomplished by the veterinary profession and especial emphasis is placed on neglected duties and ignored responsibilities, it is not because we are unmindful or unappreciative.

We realize fully the splendid progress that is being made by the Bureau of Animal Industry in its campaign against animal diseases and in the protection of the public health. The profession should show its appreciation in some dignified manner of the sacrifice that is being made by the Chief in order that his great ability may be retained for the welfare of the public and the opportunities of the members of this profession may be the greater.

There are men in all of our educational institutions today who are refusing repeated offers of large increases in salary because their interest and loyalty to the profession and devotion to a splendid work has come to mean more than momentary gain. Under the present economic conditions this can not continue indefinitely. It is, however, a great encouragement to know that we have a profession for which many strong men are willing to make such sacrifices. It denotes progress.

The splendid record of our Veterinary Corps during the recent war, when all handicaps and obstacles are considered, is tribute to our educational and professional advancement.

The great improvement on the whole in the quality of work being done by the practitioners as compared with that offered the client a few decades ago is a source of great satisfaction to the leaders in animal industry as well as to veterinarians.

The above-mentioned achievements are most pleasant to think about, but self-praise will get us nowhere, and a satisfied condition soon leads to retrogression. Therefore let us consider carefully our mistakes, shortcomings and responsibilities, as it is only by overcoming these that we shall be able to develop a greater profession and become a more important and useful part of our great social and economic organization.

As a profession we are, even when considered in the most

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

restricted sense, not a social or economic organization, but all dependent upon the proper association and articulation with other specialized units which together comprise our State and Nation. Certain duties and responsibilities always come with such association, and these we should be prepared to meet and discharge with the ability and dignity worthy of any great body of trained specialists. We may well ask ourselves whether we are prepared to meet these trials which will be multiplied and complicated by the rapidly changing conditions. In other words, are we in harmony and keeping pace with other professions and social units which like ourselves are an essential part of the whole organization?

I wish to call attention to the fact that unless we can measure up to public expectations and take our place along with medicine and other branches, with which we are constantly in comparison, we will not enjoy the confidence of the public nor will we secure the recognition which is so much discussed and sought after. Our attempts during the recent war to secure recognition which we felt we deserved in the Army and at the hands of our Federal authorities has led to considerable harsh criticism, but I wonder if a careful analysis will not reveal the fact that we ourselves were very largely to blame for this lack of confidence, which fortunately was very largely overcome by the diligent efforts and great sacrifices made by a number of very loyal members of our profession. We observe from past experience the simple fact that recognition comes with merit. This is commonly observed in any line of endeavor. There are those whose restricted conceptions have not permitted them to appreciate fully that it would be disastrous to the veterinary profession and of great injury to the live-stock industry if we were to get completely out of harmony and sympathy with the great public and accepted movements for improved agriculture.

When we consider carefully the good resolutions which were adopted on several occasions in this Association, providing for higher educational attainments, and the later retraction of these resolutions or amendments, which provided requirements equal to those of the leading medical schools previous to 1904, can we sincerely expect the same recognition as is accorded the medical profession? This is not an argument that we should not exert every effort to secure such recognition, but in case it is not forthcoming let us not be too harsh in our criticisms until we have demonstrated that we are not at fault ourselves.

Another important conclusion which we should reach is that

institutions or professions erected on a false basis can not stand. In planning our work and in framing our ideals we must have in mind the future of our profession and its relation to the other units of the organization of which we are a part. It seems to the writer that we have in the past been working on the foundation and are now just beginning on the superstructure of the great work which is to follow. I trust that the foundation will safely carry the weight that is about to be placed upon it.

One of the great needs of the future in our work is going to be educational support. Undoubtedly the support will come more readily as soon as the public appreciates the fact that veterinary education in the future is built upon and is a part of the public-school system of this country, for the support of which the public is willing to provide, if not always liberally, nevertheless sufficiently to maintain it in a creditable manner. I believe that it is safe to state without reservation that no veterinary educational institution in this country has been able to secure what would be approaching adequate support from public funds unless and until its requirements have been such as to follow out the logical and accepted public educational system in this country. It is but reasonable to expect that the public will not support an educational institution that is not in harmony with the general idea and plan for the education of young men at public expense. We have reached the time when a thorough education in any branch of medicine is too expensive to be provided for by a system of tuition, and only by public support or large endowments can institutions of this kind expect to do satisfactory service. We need, therefore, to adhere rigidly to our present standards, and, if necessary, to advance them somewhat, and let the public know that veterinary education is built up and is actually a part of our public system of higher education. We need more financial support, not so much for the building of new institutions as to improve those we already have. This Association is no more justified in approving a second or third rate State veterinary school than if the same institution were privately owned.

The situation in the world today, so far as veterinary education and research are concerned, it seems, should be entirely favorable to the advancement of this work in America so as to make us the leading nation in the world as pertains to veterinary education and research. The European countries which were spending large sums of money and engaged some of the most capable men, not only in

the veterinary but in the medical profession as well, to carry on research work regarding animal diseases, are at present so much indebted that in all probability they will only after a lapse of many years be able to support such work in a liberal way. I do not mean that we should take advantage of the situation because of their misfortune, but I do believe that for the welfare of the profession and the promotion of the animal industry we should exert every possible effort not only to keep in progress the good work which was being done but to initiate and accentuate much of which the profession and the public is in great need today. We have the resources; we have the men; a few trained, a large number untrained. We are unworthy, as a profession, if we fail to grasp the opportunities and train men who are capable of helping to solve these problems. The confidence and support of the public are necessary in order that such men may be retained in important and responsible positions. The considerable number of leading research men and teachers that are joining the forces of commercial enterprises does not encourage the outlook for American supremacy in veterinary educational and research fields. This Association can do much toward beginning a satisfactory solution to these problems.

With the vast live-stock resources of this country which are bound to multiply rapidly, we need not only teachers and research men as referred to above, but we need sanitarians and practitioners. These should be men who are capable of taking their place in the community and discharging their duties with credit to themselves and honor to the profession and with a distinct advantage to the public. Too many of our sanitary officials are more adept at political wire-pulling than efficient as organizers and administrators of a group of trained sanitarians. In the case of many the manner of their appointment is not in the interest of work without favoritism. In the training of practitioners we have necessarily undergone some gradual but marked changes. Ruminants and swine now command much more attention than they did ten years ago, not only in the dissecting room but throughout the entire courses of medicine and surgery, including clinics. In fact, we may expect to use the bovine species instead of the horse as a basis for our studies.

The character of the men who are to enter our profession from this time on can be absolutely controlled by the veterinary schools. If we have many colleges and a considerable number feel that it is necessary for them to accept students whether they are desirable or not simply because numbers are necessary in order to maintain an

institution, we can not hope to create a condition entirely favorable to the advancement of our profession. Throughout the Central West a general review of the situation reveals the fact that there has been a decrease of about 60 per cent in the attendance at private institutions. This decreased attendance has not brought about an increase at the State institutions, as one might think would occur. The attendance at State institutions has shown little change between the present and the attendance five years ago, with which time the comparison is being made. None of the State institutions are crowded; in fact, all of them could handle more students without sacrificing efficiency of equipment and teaching force. If there is need for four or five more State veterinary colleges throughout the Central West it is certainly not indicated by student attendance in the schools already established. The question of more State schools could very well be considered in detail by this Association, as it will certainly be an Association problem later.

A recent article published in the JOURNAL of this Association suggests that the Association follow the methods used by the American Medical Association; but it must be remembered that in 1904 there were 28,142 medical students in schools and 5,747 graduated that year. After all the discontinuations and mergers there still remain about 90 medical schools. Perhaps some of these facts may explain why the A. M. A. took such drastic steps to check the production of so many new and often poorly trained members of their profession. Even as an ardent supporter of good preliminary and thorough professional training, it is not advisable, in my estimation, to adopt the same course as was followed by the A. M. A. Our problems are not the same, and the conditions under which we are laboring are different. The following, taken from the same article, "The Bureau's two-year high-school requirement for entrance effective September, 1918, seems to be well in advance of the actual requirements of many veterinary colleges," leaves the impression that the author was not cognizant of the fact that the requirements mentioned are well below all State and some private veterinary colleges. The author evidently was not aware that this Association actually requires at the present time the equivalent of a four-year high-school course and that at least three States require the same for State Board examination. It is true that we need more thorough training rather than large numbers of students at present, but there is serious question whether we should, except in a few exceptional cases, go beyond the high-school requirement until everyone vitally

concerned has had time to become adjusted to present requirements. The schools would do well to exert their energy in addition to the instructional work along the lines of research in order that existing practitioners and future graduates may be equipped to cope with the problems daily confronting the practitioner.

In closing allow me to suggest that while we have accomplished many good things there remains very much to be done, and we should set about these problems with energy and determination. We must keep in harmony with the plans outlined and supported by Federal appropriations for the advancement of an improved agriculture. We must use every effort to secure more financial support for our public and educational organizations. Educational institutions are being robbed of many valuable teachers because of insufficient funds to pay the salaries required. The same lack of funds is jeopardizing the strength of the Bureau of Animal Industry. We need more united support for our educational work, and the colleges need to keep in close touch with newer developments and to fit the men who graduate from the institutions so that they will be able to cope with the problems confronting them. There is no need at present for advancing the requirements for admission to our schools, but we should stand rigidly by our present standards. Probably in the near future some schools will require pre-veterinary courses, but this should not be required for admission to this Association. In carrying on this work the Association should have a well-defined, comprehensive plan which the large majority of its members are ready and willing to support. No association that expects to be of influence and consequence can hope to succeed unless it has some definite policies toward which it is working and which it is ready to carry out without fear or favor.

Dr. E. G. Folsom, Jr., a member of the A. V. M. A., has located at Mt. Clemens, Mich., his boyhood home. The doctor was veterinarian for the Consolidated Coal Co., Fairmont, W. Va., for the past 10 years. He graduated from the O. V. C. in 1908 and took a post-graduate course there in 1920.

Dr. George E. Nesom, formerly State Veterinarian of South Carolina and until recently editor of *Modern Farming*, of New Orleans, La., has resigned to accept the management of a large sugar plantation in Spanish Honduras.

VETERINARY EDUCATION¹

By C. P. FITCH, *University Farm, St. Paul, Minn.*

THE problem of education is always before us. In all lines of activity the form and method of instruction of the student are constantly changing. This can not be better seen than in the methods used to instruct the little boy or girl how to read. When most of us went to school it was the customary procedure first to teach the youngster the alphabet both in script and in type. Also how well I remember the old chart with its few and distorted pictures and "The Cat Caught the Rat" in varied forms. Now all is changed, and the little folks learn words in connection with others in a sentence. Often this is done through the medium of the well-remembered Mother Goose rhymes, which make a vivid appeal to the youngster. But a short time elapses before the child knows his alphabet, having learned it unconsciously, and also can read simple sentences. Again the popularity and widespread adoption of the kindergarten is a fitting tribute to the wisdom of Pestalozzi.

Similar advances have been made in professional educational methods. With the incidence of the fundamental basic sciences as a part of a general college education, laboratory teaching gradually became a part of the curriculum. A student learns more quickly and better appreciates the value of a natural phenomenon when he has actually performed and observed the work in the laboratory. There is no question as to the necessity of having the basic sciences as a part of every veterinary curriculum, and the better and more efficiently they are taught the better the finished product. Chemistry, physics, bacteriology and botany all have a distinct value in giving a good foundation for the special training to come later. The point, I believe, that should be kept most clearly in mind is the type of teaching that is given in these subjects. It is a natural tendency on the part of specialists in these particular lines to have a limited horizon and to see the problems of life through glass vividly stained with the essence of their own particular subject. The purpose which should dominate the teaching in these basic subjects is not to make a specialist. A chemist, a physicist or a bacteriologist is not the product desired. A broad, well-trained practitioner of veterinary medicine should be the goal of our college

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

curricula. It not infrequently happens that the young student early generates a dislike for these basic sciences because they are taught abstractly and with little connection to the art of veterinary practice. Let us look sharply at the curriculum and note the tendency of the teaching in the basic sciences. If the student of veterinary medicine desires to become a specialist along some particular line, this instruction should be given as post-graduate work.

The aphorism "History repeats itself" is clearly illustrated by veterinary education. It follows closely the footsteps of human medicine. The nongraduate has practically ceased to exist among human practitioners. In veterinary medicine he is decreasing rapidly in numbers. The four-year course with high-school entrance requirement is now assured. This follows the demand among the medical colleges for two to four years of college work as an entrance requirement. I believe the time will soon be here when the veterinary colleges should carefully consider adopting some collegiate work as a prerequisite for entrance. However, let the watchword be "Make haste slowly." Evolutionary changes are usually much more lasting than revolutionary ones. Let us first thoroughly stabilize our veterinary training in a four-year course with high-school entrance before we attempt to add further requirements. On the other hand, this is an age of rapid advancement, and let us not fall behind in the progressive march.

Veterinary instruction is confronted with a problem peculiar to itself. From the beginning the veterinarian has been known as the "horse doctor." In one way this term was perfectly fitting, in that the practitioner earned most of his fees treating horses. With the advent of the automobile and the greatly increased value of purebred cattle, sheep and swine the character of veterinary practice has markedly changed. The name is no longer applicable. Until the present drop the value of the average hog was comparable to that of the average horse. The \$50,000 and \$100,000 sire was unheard of a few years ago, and if someone had told you he paid \$5,000 for a pig you would have thought that "a fool and his money are soon parted." Yet these are not uncommon prices for purebred live stock today. This greatly increased value has materially added to the duties and responsibilities of the veterinarian. The large practice of the city veterinarian has dropped off because his principal source of revenue was in the treatment of horses. On the other hand, the work of the country practitioner has markedly increased, owing to the advance in the value of cattle, sheep and swine. The question which confronts the veterinary educator is so to change the

type of instruction as properly to qualify the graduate to render an efficient service to his clients in the treatment of this class of animals.

The teaching in veterinary colleges in the past has been largely devoted to the horse. The students dissect the horse for anatomy. They learn physiology based on the horse. Dosages of the various drugs are compiled with the horse as the standard. It is true that all of our institutions give a certain amount of comparative work with the large animals, but do they give enough? How much time is devoted to the diseases of swine when hog cholera is eliminated? Swine obstetrics is becoming more and more important. The diseases of sheep should receive special attention. Most important of all are the diseases of cattle. The value of the cattle, sheep and swine has greatly increased during the past decade. The following table gives in round numbers their farm value according to the 1918 Yearbook of the United States Department of Agriculture:

Comparative Value of Cattle, Sheep, Swine and Horses

	1910	1919
Cattle	\$727,000,000	\$1,836,000,000
Sheep	216,000,000	579,000,000
Swine	533,000,000	1,665,000,000
Total	\$1,476,000,000	\$4,080,000,000
Horses	\$2,142,000,000	\$2,120,000,000

It will be noted that during this period the value of horses has actually decreased while the value of the other classes of live stock has more than doubled. Has the teaching of our veterinary colleges made an equal change? If it has not, it is failing to give the student the training which fits him to render an efficient service or to raise the standards of the profession.

There is a great stimulus for a thorough training in veterinary medicine in the fact that general education along scientific lines includes a fundamental knowledge of the biological sciences. As was pointed out by Moore in a paper on veterinary education before this Association in 1911, "The United States Bureau of Animal Industry, experiment stations and agricultural colleges are popularizing technical knowledge and sending it broadcast throughout the country in bulletins and circulars so that those who escape the college curriculum are caught in the coils of these popular mechanisms for instruction. With a client versed in the very sciences that must be applied by the veterinarians, can a practitioner hope for

success or even for a chance of success if he himself is not in possession of a still greater knowledge of these same subjects?"

More than a majority of the large breeders of this country are graduates of colleges or schools of agriculture. Here they have received a training which renders them able to judge effectively the character of the veterinary service rendered. Many of the agricultural graduates have received some training in veterinary science, and because of an inferior service they attempt to treat their own animals, thereby not only doing their stock incalculable harm but markedly attacking their pocket-books. The remuneration for these cases is lost to the veterinary profession as well as the prestige which rightfully belongs to those who guard the health of our food and dairy animals. It is an economic loss which reflects directly on the training received in our veterinary colleges.

In this connection it might be well to state that it is our belief that the training received in veterinary science in many of our agricultural colleges partakes too much of the applied and far too little of the fundamental subjects. It is the natural tendency on the part of all teachers and students of agriculture to desire the information that immediately qualifies them to treat all the diseases to which the live-stock world may be subject. The gratification of this desire is the pitfall into which some of our agricultural colleges have fallen. The goal of veterinary instruction for agricultural students is to inculcate into the minds of our future live-stock breeders a thorough appreciation of the value of an efficient veterinary service and the vastness of the field of comparative medicine. This can be done only by giving instruction in the basic sciences and then pointing out their application. Furthermore, all live-stock owners should have information concerning the prevention and control of the infectious diseases which cause such an enormous loss. With the proper perspective agriculturists are much less likely to attempt the treatment of their sick animals, and further, they will call a veterinarian for advice in the beginning of an outbreak, for they have a thorough understanding of the dire consequences which may result if the proper precautions are not taken. They are going to demand an efficiently trained and thoroughly competent man. It is the duty of our colleges to supply this individual.

The war situation precipitated a state of affairs in veterinary instruction in this country which has hung in abeyance for some time. In 1915 there were in the United States 22 veterinary schools having 2,608 students and 675 graduates. Last year there were in active operation 14 schools. Based on the 1915 figures, the number

of students in the schools engaged in teaching last year would number 1,571, or a decrease of instructional capacity of 39 per cent. We have understood that some of these schools have this year reopened their doors, but definite information is not at this moment available.

The college year 1919-1920 finds conditions more normal for our educational institutions. The effect has been a marked increase in registration in all our colleges and universities. For example, Illinois, Wisconsin, Cornell and Minnesota have the largest student bodies in their history. Has there been a proportional increase in the registration of the veterinary colleges? Figures obtained from 12 of the veterinary schools show that the total registration is 825 students. The total number of freshmen in these schools is 272. The following table gives the details of this year's registration compared with five years ago in 1914:

Registration in Veterinary Colleges for 1914 and 1919.

COLLEGE	1914		1919	
	Total Students	Freshmen	Total Students	Freshmen
Alabama Polytechnic Institute.....	67	20	45	17
Colorado Agricultural College.....	60	21	84	32
Iowa State College.....	101	41	109	36
Kansas State Agricultural College.....	67	20	80	27
McKillip Veterinary College.....	204	82	83	22
Michigan Agricultural College.....	48	18	30	9
New York State Veterinary College at Cornell University.....	114	50	104	39
Ohio State University.....	185		100	33
Washington State College.....	40		46	6
University of Pennsylvania.....	122	46	54	11
Ontario Veterinary College.....	290		78	33
North Dakota, 2 years.....	11	7	12	7
Total.....	1,309	305	825	272

If one compares the registration of this year with that of five years ago we find that there is a decrease of 37 per cent. With the figures at hand the freshmen class shows a decrease of 34 per cent, showing that the falling off is probably about uniform in the various classes. When one takes into consideration two facts that should make for an increased registration, i. e., the four classes instead of three and the decrease of 39 per cent in instructional capacity, these figures are astounding and difficult of explanation. There is no doubt that lengthening the course to four years and raising the requirements to a full four-year high-school course has tended to

keep down the number of students in some of the schools, but we do not believe that these changes are entirely responsible. War conditions may also affect the total, but in the light of a marked increase in registration in other courses this explanation "fails to explain." The fact remains that this year the total veterinary student body is decidedly below the pre-war number.

We can not escape the thought that this is a critical period in the history of veterinary education. With the increased value of live stock, the municipal, State and Federal sanitary regulations which require the professionally trained man to enforce, the outlook for the present veterinarian is bright. We know of many country practitioners who have practices which run from \$4,000 to \$8,000 yearly, and these are not exceptional. We need to look carefully at our curricula and note whether we are properly fitting the embryo veterinarian to take his place among professional men. With the closing of a number and among these the largest of the private veterinary schools an increased responsibility devolves on the State schools. In order to meet these conditions there is considerable agitation toward the formation of new veterinary departments in connection with the State universities in several States. For example, this year on a notice of less than a month a two-year course in veterinary medicine was established at a State university. This was ostensibly to take care of returned soldiers. We understand that 9 students registered in this course. The multiplicity of small, poorly equipped and insufficiently supported State schools does not tend to increase the efficiency of veterinary training. The cost of properly training a veterinarian is large. It compares with the cost of instructing the medical practitioner, and ranges from \$350 to \$700 a year for each student. This represents only the actual instructional outlay and does not take into consideration the initial investment for buildings and equipment. These latter are an important adjunct to efficient teaching. The best-informed teacher in the world can not do his work well if the necessary funds are not provided for accommodations and laboratory apparatus.

If a State is willing to back its educational institution with sufficient money to equip it properly to give efficient instruction, and is willing to continue this backing despite a limited student body, this is an entirely different matter. Those who have had experience with legislative bodies, however, know and thoroughly appreciate the difficulty of obtaining sufficient funds to carry on the work properly.

In the light of the present registration we should turn our attention to the improvement of the existing schools. We believe that

special effort should be made to improve the instruction in the basic sciences, giving that instruction which not only grounds the student in the principles which underlie these sciences but which points out the application of these principles in the practice of veterinary medicine. More attention should be given to pathology and postmortem technic, as here it is that the practitioner learns of his mistakes. The autopsy is one of the greatest teachers, and many of our veterinarians completely neglect its significance. Mistakes often go unnoticed because the busy practitioner fails to perform a careful postmortem or is unable to interpret the findings. More and better autopsies should be a part of nearly every college curriculum, and the student should be so taught the exceedingly great value of these examinations that he will carry this knowledge to the field of practice.

More attention should be given to parasitology, and especially its relation to the diseases of sheep. You will remember that it was only two years ago that the members of the American Veterinary Medical Association were told by an eminent parasitologist that they were grossly ignorant of the first principles which underlie this science. Have our educational institutions taken steps to make good this deficiency? Let us keep the fact clearly in mind that we are not to turn out parasitologists but veterinarians so versed in this subject that they are able to recognize the ordinary parasites and diagnose and treat the diseases caused by them.

Finally, we should look sharply at our curricula and note whether there is sufficient time devoted to the consideration of the diseases of swine and cattle. Within the past few years great attention has been drawn to the diseases of the genitalia of these classes of live stock. This group of affections is alone worthy of exceedingly careful attention, and graduates should be intensively trained in their diagnosis and treatment. Our veterinary colleges are no longer educating "horse doctors," but well-trained and efficient veterinarians skilled in the diagnosis and treatment of the diseases of cattle, sheep and swine.

Let us put our shoulder to the wheel of progress in the art of imparting knowledge of the science of veterinary medicine. As Moore said in 1911, "We can do it in no better way than to dedicate ourselves anew to the work which has been so well begun, to the end that the science and the art of veterinary medicine shall come fully to share if not to lead the great wave of modern useful knowledge 'which rolls with the tide that encircles the globe.'"

COURSE TO BE PURSUED IN LABORATORY DIAGNOSIS¹

By E. A. LOGAN, *St. Joseph, Mo.*

THE course of instruction in laboratory diagnosis should be given in the senior year, after the student has successfully completed his work in anatomy, bacteriology, pathology and chemistry, and he should be advanced as far as time will permit in theory and practice so that he will have a good knowledge of the symptomatology and pathology of the various diseases considered in that subject. This work should cover a period of not less than 15 weeks, about 4 hours each week, exclusive of urine analysis, which should be a short course in itself. In outlining the course I would recommend the following arrangement:

1. Ten hours can always be very profitably utilized in reviewing the various theories which are fundamental in all laboratory work. Necessarily this time has to be spent in the class-room, where a blackboard and some charts are available.

2. Twenty hours should be utilized in the study of known cultures of specific organisms. I would limit the number of organisms to be considered in this work to five, selecting the ones with regard to which a technician is most frequently called upon to assist the practitioner in arriving at an accurate diagnosis, and also those in which a laboratory diagnosis is most reliable. For example, I would select the *Bacillus abortus* as one organism to be considered, beginning with the isolation and identification of the organism from infected tissue if possible. If such material is not available, a contaminated artificial culture may be substituted. In connection with this work the student should be required to keep a complete set of notes fully describing the characteristics of the organism, and his observations of cultures, etc., should be recorded daily. When practicable the pathological lesions caused by the organism should be demonstrated. In some cases the inoculation of laboratory animals furnishes excellent material for this purpose. Of course this step in most cases is impossible in the limited time allotted to this course.

3. Twenty-five hours should be devoted to serological work, taking up first the agglutination test, using as an antigen cultures of

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

each of the five organisms previously studied. This test should be completely and most thoroughly worked out by each student in the class. With the antigen prepared by the class one laboratory animal should be injected, which will furnish material for the entire class even though it be large. Previous to injecting the antigen, however, a small quantity of blood should be drawn from the animal, enough to supply each member of the class with about 5 drops of the clear serum. This should be well sealed and stored in the ice box for future use. I have found that an injection of about 5 to 10 c.c. of properly attenuated antigen is sufficient in a rabbit to produce a good agglutination in about 7 days, while 2 to 5 c.c. is a plenty to produce the same result in a guinea pig. Ordinarily one injection is enough to produce a very frank agglutination of the organism. Two injections given five days apart will not only cause agglutination to occur more readily but will be much more apparent in contrast with the serum drawn previous to the first injection of the antigen.

By actually performing these experiments it dawns upon the student for the first time just what the agglutination test indicates and under what conditions he may expect a reaction, and also the errors and complications which enter into it. He sees at once that this test would be of no avail in an acute disease, and that an immunized animal will react as readily as one actually suffering from the disease.

At the same time this work is being done the preparation of material for the complement-fixation test may also be prepared so that no time will be lost. Each student should have the privilege of running at least one test of this kind. It is the opinion of the writer that one of the best lessons in animal resistance can be so clearly demonstrated in the preparation of a hemolytic amboceptor that even the most stupid member of the class can not fail to appreciate its importance. Each of the five components in this test should be worked out by the students, and its application demonstrated.

4. Five hours' work should be devoted to the study of diseased tissue. This time can all be very profitably used in the diagnosis of rabies. The diagnosis of this disease is important and should be made by the veterinarian. It is a disease where an accurate diagnosis is absolutely demanded. Careful technique and experience are the most essential factors in the work. Aside from a microscope, such staining material as is commonly used in microscopic work is all that is needed.

STRONGYLUS RUBIDUS AS AN ETIOLOGICAL FACTOR IN GASTRIC LESIONS OF HOGS

By W. J. CROCKER and H. E. BIESTER, *Philadelphia, Pa.*¹

IT is perhaps not an infrequent coincidence that a number of individuals, each expertly conversant with the clinical and epidemiological characteristics of hog cholera and other diseases of swine, differ as to the diagnosis of a particular case when all are assembled in conference and each is provided with the same history and opportunity for clinical examination. This is not at all surprising when the same diversity of opinion is not uncommon among field and laboratory pathologists during autopsy consultations, where greater opportunities for study are available.

These facts point strongly to the dearth of complete and exact data pertaining to the comparative pathology of the diseases of swine and particularly those of the alimentary tract. They show the need for a more careful and elaborate investigation of these diseases by those to whom material is available. They demand not only blood transmission controls of suspected cases of hog cholera, and bacteriological investigation, but the most exacting autopsy examinations aided by the use of a hand lens and careful histopathological routine study. In this way minute animal parasites and parasitic eggs will not be overlooked and may be proved to be far more important than is at present conceded as etiological factors in swine enzootics which so closely simulate the clinical and pathological characteristics of hog cholera and other diseases of hogs as to induce confusion in making a differential diagnosis.

Through the courtesy of Dr. J. G. Green, of the New Jersey Department of Agriculture, six 3-months-old pigs were sent to the Veterinary Laboratory of Pathology and Bacteriology of the University of Pennsylvania from a farm at Ashland, N. J., for examination. The previous history of the cases was as follows:

In January, 1919, a severe epizootic of hog cholera on a farm in southern New Jersey occasioned the loss of a large number of pigs. The outbreak was checked by the administration of the serum-virus treatment. Subsequently all the pigs from the early spring litters were lost through abortion. The offspring of later matings which were farrowed in April and May were given the simultaneous treat-

¹ From the Laboratory of Veterinary Pathology and Bacteriology, University of Pennsylvania.

ment for hog cholera at the age of 3 months. The pigs did well for a few weeks, and then a number of them, including those sent to us for investigation, developed a very bad cough followed by diarrhea. The feces were blackish in color. Emaciation and weakness developed, though polyphagia and polydipsia were manifest until the animals were unable to reach the trough. There was an elevation of temperature in the beginning, but it receded to normal and the pigs died from cachexia in from 3 to 6 weeks from the time diarrhea began.

In November, 1919, when the six pigs from Ashland reached the University, one was found dead. This pig was immediately autopsied. It presented white mucous membranes and a dry skin with scaly, parchment-like areas. The stomach contained a small quantity of semifluid brownish food material. It presented a large oval yellow diphtheritic membrane, approximately 6 inches (15 cm.) in diameter, the margin of which was lobulated. The texture appeared as though it were made up of numerous sunflower petals. The ileo-cecal valve presented small depressed necrotic areas. The liver was bluish yellow and friable, the capsule stripped with ease, hepatic structure was distinct, cut surface convex, incision filled with liquid blue blood.

The lungs were in a state of inspiration; visceral pleura smooth and shiny; small isolated areas were of meat-like consistency, and small pieces sank in water. On section these lobular areas presented a high refractive index, and mucus could be squeezed out on the convex cut surface. The bronchi contained a few *Strongylus paradoxus*. The color of these lobular solid areas was mottled yellowish red. Later pure cultures of *Bacillus suisepiticus* were isolated from these lobular areas.

The spleen was slightly increased in size, margins rounded, dark red in color, incision moist, and the cut surface presented dark brown pulp, visible trabeculae, hypertrophied Malpighian corpuscles which appeared like round translucent white tapioca-like bodies in the pulp.

The kidneys were pale grayish red, sides flattened, capsule easily stripped, incision moist, cut surface flat and characterized by a cortex of proper width, presenting faintly visible alternating red and yellow lines, and myriads of tiny red dots, which were not hemorrhages but hyperemic glomeruli of the Malpighian corpuscles, simulating a sprinkling of red pepper. The intermediate zone was

fairly distinct, the medulla was faintly streaked with red and yellow lines, and the pelvic lining smooth and shiny.

Pig No. 2 died 4 days later, and at autopsy presented the same lesions.

Pig No. 3 was destroyed 12 days after the death of the first pig, and at autopsy showed the same stomach lesions, slight lobular pneumonia, and catarrhal follicular enteritis.

Pig No. 4 died a few days after the death of No. 3. The stomach presented similar croupous membranes, a clean ileo-cecal valve and a few minute intestinal depressions. The lungs, as in the other cases, showed slight lobular pneumonia and a few *Strongylus paradoxus*.

Pig No. 5 died 4 weeks after arrival. The stomach presented the same croupous membranes. The intestines showed a mucous exudate on the surface of the mucous membrane. The lungs showed a few slight lobular pneumonic areas in the apical lobes and a few calcified parasitic nodules.

Pig No. 6 was emaciated and manifested a high degree of thirst but a poor appetite. Five weeks after its arrival it was destroyed, and at autopsy the stomach presented a slightly swollen, reddened mucous membrane, from which free blood could be removed by contact. The ileo-cecal valve was clean, and the intestines presented minute depressions. The lungs showed very slight lobular pneumonic areas. No other lesions were manifested.

At this point it must be stated that we were not dealing with an epizootic of hog cholera, as the possibility of this disease was eliminated by inoculating healthy pigs from another farm with material from pigs which presented the symptoms before described, with negative results.

Specimens were taken from the intestines and stomach, and microscopic sections made.

Stomach.—Sections from the stomach presenting croupous membranes on microscopic examination showed the muscular coats intact, necrosis of large areas of the mucous membrane, many of the folds entirely degenerated, replaced or covered by a mass of fibrin and cellular detritus in the form of a croupous membrane. (Fig. 1.) This croupous membrane contained in its meshes a great number of large oval eggs in the moruloid stage. The shells of some were dissolved and many of them were partly disintegrated, leaving numerous cells arranged in twos, threes and fours, which resembled hepatic cells. In several preparations there appeared one or more transverse sections of a roundworm. (Fig. 2.)



Fig. 1. Croupous membrane on the stomach mucosa of a pig.

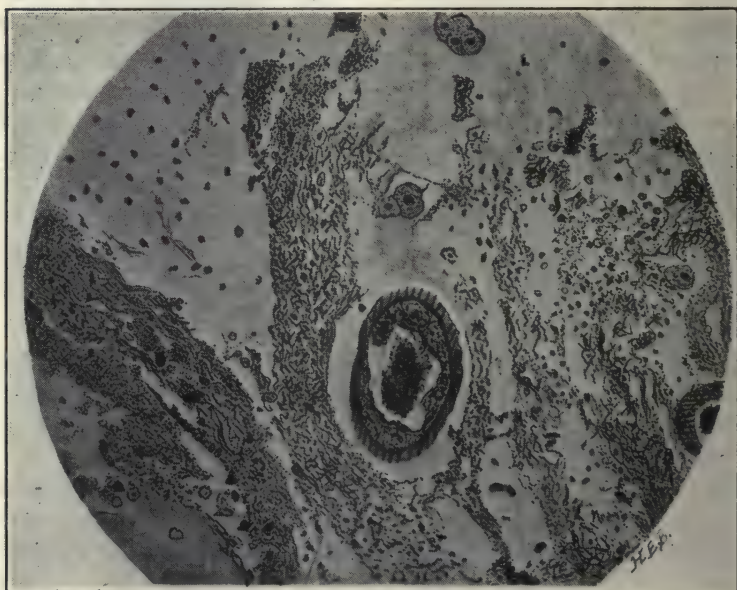


Fig. 2. Transverse section of worm and several partially disintegrated eggs in croupous membrane upon the gastric mucosa.

Intestine.—Microscopical examination of the intestinal specimens revealed nothing specific.

It might also be mentioned that sections stained for micro-organisms were negative.

The several stomachs which were taken at the autopsy table and preserved in Kaiserling solutions were later carefully examined. A great number of small worms which had the appearance of a human eyelash could be lifted from the surface of the croupous membrane and likewise taken from the interior of small teased portions. In areas of considerable size around and near the croupous membranes, where the mucous membrane of the stomach macroscopically appeared unchanged in color and texture, were small pin-point perforations. In some places these small parasites had actually burrowed half the length of their bodies into the apparently healthy stomach mucous membrane, and could be pulled out with a delicate pair of forceps.

We made about 100 preparations of these parasites. In doing this we observed that almost all the worms taken from the surface were females, while the greater number teased from the depths of the croupous membrane were males. This fact may not be of great import, but as little or nothing is known of their life cycle it may not be unworthy of mention.

Not having literature bearing upon this parasite, except its mention in the several textbooks and one article by Foster (3) on the roundworms of domestic swine, we first confused it with *Arduenna strongylina*. While in Washington we submitted several specimens to Dr. Maurice C. Hall, who identified them as *Strongylus rubidus*. We then obtained copies of the literature on this organism by Hassall and Stiles (1) and by Opperman (2). From the descriptions of this parasite as contained in these publications we confirmed the identification of our specimens as being *Strongylus rubidus*.

When this parasite was determined to be a new species by Hassall and Stiles (1) in 1892, it was described as follows:

"Color reddish, body thin, straight or coiled, as it lies on the mucous membrane. Head slightly inflated; inflated portion (female) measuring 0.012 mm. long by 0.028 broad. The cuticle is finely striated transversely, and has also 40-45 longitudinal striæ, 0.004 mm. broad, such as are seen in *Strongylus contortus* of cattle and sheep. Lateral line prominent. Mouth small, round, unarmed. Two lateral cervical spines are present 0.67 mm. (female) from the mouth. The cuticular lining divides the esophagus indistinctly into two portions. The anterior portion is 0.24 mm. long

and about 0.02 wide; the posterior portion 0.4 mm. long and 0.042 wide at the posterior end. The muscular striation of the posterior portion is much broader than that of the anterior portion. The division between the two portions lies just before the ventral pore. The intestine is cylindrical, 0.04 in diameter, greyish-black, and winds spirally with the genital organs. Cephalic glands prominent, 0.99 long, and 0.02 broad. Excretory pore 0.23–0.29 from the mouth (female).

“Male: 5 mm. long, 0.087–0.128 broad. Bursa 0.3 broad by 0.195 long, two lateral lobes continuous anteriorly, distinct posteriorly and connected by a small median lobe. Two transverse ridges divide the inner surface of the bursa into four polsters, two of which lie each side of the median line. Costæ all separate for nearly their entire length. Middle lobe with two pairs of rays. Spicules double 0.13 long, 0.02 broad. Anus square or oblong, 0.01 by 0.004. Anterior to the anus is a peculiar forked chitinous support 0.012 broad by 0.014 long, the fork opening towards the anus; a narrow chitinous strip, 0.06 long, is seen dorsal of this fork, and probably corresponds to the unpaired chitinous support found in other strongyles, *Str. contortus*, although it is very much more simple in structure.

“Female: 8–8.5 mm. long by 0.11 broad, anus 0.68 from tip of tail. Vulva 1.3–1.5 mm. in front of the anus. Directly caudad of the vulva is a small semilunar cuticular fold, about 0.04 long by 0.013 broad. Vagina is bottle-shaped and at right angles to the body wall, 0.056 long. Two uteri are present, branching off at right angles to the vagina. The first 0.2 of the uterus has a very prominent cuticle lying in folds, and is surrounded by a thick striated tissue, resembling muscle. Eggs 0.045 by 0.036; cleavage begins in the mother.”

Following our experience with the New Jersey pigs, we examined the stomachs of about 400 pigs at the West Philadelphia abattoir, pigs which had passed the antemortem inspection and were apparently healthy. We found 60 per cent to be infested with *Strongylus rubidus*. The stomachs were examined very carefully at the slaughterhouse, but revealed nothing except some ulcers “covered” by parasites while others showed hyperemic areas with *Strongylus rubidus* apparently resting on top of the intact stomach mucosa in a layer of mucus. Numerous stomachs presenting normal and various inflammatory stages of the mucous membrane with parasites on the surface were taken to the laboratory, where they were very carefully examined and a great number of specimens prepared for microscopic sections.

Macroscopically many of these specimens revealed nothing to indicate that this parasite (*Strongylus rubidus*) did anything except

rest upon the mucous membrane in a harmless fashion. This belief is held by Hassall and Stiles, who report:

"So far as it is possible for us to state at present, the worm appears to have scarcely any clinical importance. It has been found in some cases in such numbers that the mucus of the stomach seemed to be blood-stained, while at other times but few were present. A number of cases were found in which there was an extensive ulceration in the stomach, but this was not constant in pigs containing the parasites; in fact some ulcers were found in stomachs where we could discover neither *Str. rubidus* nor *Sp[iroptera] strongylina*, so that we do not at present feel justified in considering the worms as the cause of ulceration, although we suspected it for some time. It can, however, be stated that in all cases where large numbers of *Str. rubidus* were found, there was an excess of thick mucus present, which gave us the impression that the catarrhal state was due to irritation by the worms.

"In some lots of hogs we examined, *Str. rubidus* was present in 75 per cent, while in others the percentage ran as low as 25. As the parasite is extremely small, it is often overlooked, and this may account in some degree for the low percentage sometimes found. It may be added that we have not counted in the 75 per cent and 25 per cent those cases where only one or two worms were found, for these could easily have been transferred to the stomachs by our hands in examination, or by contact with other stomachs in the same box, for we examined them after they had been turned inside out in the process of preparing them for 'hogshead cheese.'"

However, examination of the microscopic sections from the abattoir specimens as well as those from the Ashland, N. J., farm, showed the parasites in the mucosa, and the microscopic folds of the mucous membrane around and near the parasite were degenerated and necrosed, due to the mechanical and toxic injury upon such stomach membrane. Such necrosis can not be attributed to other causes, and it must be noted that pieces of tissue presenting such a microscopic picture appeared normal to the naked eye, and at the abattoir looked apparently healthy with the parasites merely resting on top in a layer of mucus.

Opperman (2) in 1905 reports on a case in Westphalia, Germany, as follows:

"This parasite is of importance not only to parasitologists, but also to veterinarians, inasmuch as it is responsible for enzootic affections of swine in Germany. One case of a sow which died presented at autopsy a heavy gastric infestation with these parasites to the complete exclusion of other organic changes. The lesions of the stomach, produced apparently by this parasite, were: Mucous membrane of the cardia covered by a thick, tenacious, glairy mucus.

Fundus showed highly reddened mucous membrane, presenting an area of 7 or 8 inches in diameter covered by a mass of mucus mixed with crumbly yellowish-gray particles. The apices of the gastric folds presented crumbly masses, which fused on the margins to form plates of croupous membranes on the surface of the stomach (1.5 mm. thick). Cardia mucous membrane 1.5 mm. thick. Fundus mucous membrane 3.5 mm. thick, greatly swollen, slightly elastic, and cut with difficulty. Small, delicate, scarcely visible red worms distributed over the entire surface of the gastric mucous membrane, in the clumps of mucus, and under the pseudomembranous masses. Microscopic examination of the pseudomembrane presented numerous eggs of these parasites."

Opperman confused *Strongylus rubidus* with *Arduenna strongylina* (formerly called *Spiroptera strongylina*) because the lesions found in this case of *Strongylus rubidus* infestation were identical with the lesions described by Von Ratz (*Zeitschrift für Tiermedizin*, 1899, Bd. 111). Corroboration of Opperman's diagnosis of *Strongylus rubidus* was made by Von Linstow.

We experienced the same difficulty, as the lesions found in the pigs autopsied at the University were identical with those described by Foster (3), as produced by *Arduenna strongylina* and *Physocephalus sexalatus*. In about 20 per cent of the *Strongylus rubidus* infested stomachs examined at the West Philadelphia abattoir we found also specimens of *Arduenna strongylina*.

The German investigator states that *Strongylus rubidus* had never been found in Germany prior to the outbreak of an epizootic reported in 1905, and attributes its appearance on the Continent at that time to the importation of American feeds and grains which he claims to have been infested with the eggs of this organism.

Opperman reports further upon an outbreak of this condition:

"Two years later on the same premises (an estate in Westphalia, Germany) there appeared additional cases, one of which presented stomach lesions characterized by small ulcers. The clinical symptoms comprised anorexia, diarrhea, and progressive emaciation. Eagerness for particles of lime and stones. Gradually the entire herd of 30 breeding sows became involved so that in March they presented diarrhea and great loss of condition. The condition of the yard—common rooting yard by stables, ground unpaved and covered with manure of pigs and horses, which developed small wallows filled with water from manure and also mud.

"Two sows were sent to the Hygienic Institute for observation. Results: No. 1, 127 pounds, first litter, emaciated so that she could not nourish her 4-weeks-old pigs. No. 2 also became emaciated, but began to recover because of administration of vermifuge.

"Examination showed: Sleepy, inactive, coat scaly and dry.

Temperature, No. 1, 38.5 to 40° C.; No. 2, 37.5 to 39.0° C. Conjunctiva pale, feces thick and cheeselike. The animals licked the walls and stones, and were especially eager for plaster and lime. An examination of the feces revealed numerous eggs of *Strongylus rubidus*. During the several weeks of observation the appetite of No. 1 diminished considerably, that of No. 2 improved, although slowly and irregularly. This latter sow received, 14 days after arrival at the Institute, for a period of 8 days, twice daily, a mixture of Glauber's salt and sodium bicarbonate (5 to 1). After this it received a vermifuge of arsenic acid and calomel. In the expelled thin cheeselike watery feces were found very many *Strongylus rubidus* eggs, although no worms were found. Five days after the administration of the vermifuge another feces examination was made, and only 2 eggs were found. This sow continued to improve and in three weeks gained 23 pounds.

"Sow No. 1 continued to emaciate to a skeleton and died 12 weeks after arrival at the Institute. The autopsy of this sow revealed: In the stomach small amount of very mushy or gruel-like contents. Mucous membrane gray-white in fundus, with a shade or tinge of grayish red in cardiac portion, covered with considerable tenacious mucus masses. On the 3 mm. thick, strongly wrinkled, swollen fundus mucous membrane were tough, flocculent fibrin-like masses. Especially under these covers or fibrin masses were countless numbers of very small red worms, which wiggled slowly back and forth. Microscopic examination showed them to be *Strongylus rubidus*. No other organ except the stomach showed any pathological changes."

Opperman in his article describes the clinical and postmortem pictures of 4 other sows, which cases appear to be analogous to those he described previously, except that he mentions one as being affected with a slight pneumonia, which he disregards as being of no importance, and finally states:

"On the failure to unearth or show any other proof of etiological causes at the autopsy or through the anamnesis, the chronic stomach disease was the single and only result of the strongyle. As a result of this, the clinical picture, the poor appetite, the wasting away to a skeleton, must singularly and only be looked upon as the direct result following the high-grade chronic stomach affection through the *Strongylus rubidus*."

Opperman further states in his résumé:

"The changes produced by this parasite consist of a diphtheritic, i. e., chronically inflamed affection of the mucous membrane, which, especially in suckling mothers, readily produces a high-grade anemia, indicating a chronic siege, and can result in the death of the animal."

We are not inclined to believe that this parasite can of its own accord produce lesions which will prove fatal unless there is a primary cause operating which reduces the vitality of the stomach mucous membrane, and permits the parasite to cause pathological alterations characterized by inflammatory processes ranging up to the formation of croupous membranes.

In the case of the New Jersey pigs autopsied at the University of Pennsylvania the postmortem evidence seems to indicate that the pneumonia caused by *Bacillus suisepiticus* is the primary cause, which is instrumental in reducing the vitality of the stomach mucous membrane, and thus permits *Strongylus rubidus* to become actively engaged in invading the stomach mucosa and produce the picture described in the first pig autopsied at the University, i. e., croupous membrane, with large numbers of *Strongylus rubidus* lodged therein, pin-point perforations, in some of which the organisms (*Strongylus rubidus*) were partly concealed and from which the worms could be removed by a delicate pair of forceps.

In the one case cited by Opperman it is believed that he considered the pneumonic lesions too lightly as not being an important factor in this condition. The other cases cited by him (Opperman) as occurring in breeding sows he states "appeared to be a chronic siege." Probably the severe drain of suckling pigs on the sows lowered their vitality and made the stomach mucosa susceptible to the invasion of *Strongylus rubidus*. Of course other causes such as inappropriate feed may likewise be a contributing factor in lowering the resistance of the stomach mucous membrane against this or any other organism.

In our opinion it appears that *Strongylus rubidus* holds the same relative position in the case of swine as *Bacillus coli* in the case of cats. This micro-organism (*Bacillus coli*) will produce a condition termed coli-bacillosis, and occurs frequently in cats which are taken from their usual habitat and environment and confined in a strange place. They will become homesick, worry and refuse food, and as a result the vitality is reduced, and the ever-present colon bacilli pass through the intestinal mucosa and produce a picture of septicemia, followed by death. *Bacillus coli* can be isolated from the intestines of healthy cats, yet this fact does not permit us to contend that there is no such disease as coli-bacillosis, nor that the organism is absolutely harmless and can not produce disease.

We can not regard *Strongylus rubidus* as a harmless parasite and as being of no clinical importance merely because it is found in

large numbers in apparently healthy hogs, for the finding of the parasite imbedded in croupous membranes, and beneath them, as well as partly perforating the mucosa, certainly must be regarded as important.

Furthermore, finding the parasite imbedded in the mucosa of sections of stomach which appeared normal macroscopically at the abattoir, and the necrosis of folds of mucous membrane around the parasite as revealed in numerous microscopic sections prepared in the laboratory, conclusively prove that this organism is capable of producing lesions.

At the same time we can not agree with the radical view taken by the German authority and consider *Strongylus rubidus* as the primary and specific etiological factor in producing disease; but our evidence indicates, as stated before, that *Strongylus rubidus* will produce a catarrhal gastritis and microscopic lesions, but will not cause the death of an otherwise healthy animal by its action on the stomach mucosa, unless some primary debilitating factor is operating to reduce the vitality of the stomach mucous membrane and permit the parasite to invade it freely. So far as is known this may be any disease which produces a chronic systemic disturbance.

Not only are the advanced lesions produced by *Strongylus rubidus*, when a primary disease process is operative, of importance in so far as they may form the port of entrance for micro-organisms but chiefly from a standpoint of differential diagnosis in cases of the septicemic form of hog cholera, when such parasitic lesions may readily be mistaken for those of hog cholera unless one uses great care, a hand lens, or anticipates the presence of these parasites, notwithstanding the difference in the time factor of acute hog cholera and this parasitic infestation.

CONCLUSIONS

1. *Strongylus rubidus* can produce severe gastric lesions and systemic disturbances, resulting in death, when a primary disease process is present which lowers the vitality of the stomach mucous membrane.
2. Very slight bronchopneumonia due either to *Strongylus paradoxus* or *Bacillus suissepticus* may constitute the primary debilitating factor.
3. *Strongylus rubidus* can produce heavy catarrhal exudate and small ulcerations of the gastric folds, which can be determined microscopically.

4. The distribution of pneumonic areas was not sufficiently widespread to induce death by pneumonia and septicemia.

5. Necessity of using care in differentiating the advanced gastric lesions of *Strongylus rubidus* and those in the septicemic form of hog cholera at autopsy.

6. Importance of checking up postmortem findings by laboratory methods and diagnosis.

7. Necessity of arousing the interest of parasitologists in an effort to work out the life cycle of *Strongylus rubidus*.

8. Closer coöperation of comparative pathologists, field investigators and parasitologists with a view of shedding light on this problem as well as diseases which may be confused with it.

REFERENCES TO LITERATURE

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Dr. Walter J. Crocker has resigned as Professor of Veterinary Pathology in the School of Veterinary Medicine at the University of Pennsylvania, and Dr. Benjamin M. Underhill has been appointed Professor of Veterinary Pathology and Parasitology and will take over the courses in pathology and continue his work in parasitology. The resignation of Dr. Crocker took effect on June 30 and Dr. Underhill's appointment became effective on July 1. Dr. Underhill has been a member of the teaching staff of the Veterinary School at the University of Pennsylvania for 12 years.

Dr. E. I. Smith, formerly in charge of the tick eradication force of the Bureau of Animal Industry in Louisiana and Resident Secretary of the A. V. M. A. for that State, has been transferred to Hartford, Conn., where he will assume charge of Bureau activities in coöperation with the State officials. President Cary has appointed Dr. Edward Horstman to succeed Dr. Smith, and he likewise assumes charge of the tick eradication work in Louisiana.

NOTES ON A MICROCOCCUS ISOLATED FROM CASES OF BRONCHO-PNEUMONIA (SO-CALLED "FLU") OF SWINE¹

By CHARLES MURRAY, *Ames, Iowa.*

DURING the fall and winter of 1918-9 there occurred throughout the swine-raising States, particularly of the Mississippi Valley, a disease of swine before unobserved on so large a scale. The mortality of the disease was very low, probably less than 1 per cent, but the economic loss, due to swine being off feed for a week to ten days, and to the setback resulting, was enormous. Variouslly diagnosed as mixed infection, swine plague and hemorrhagic septicemia, there was much confusion among veterinarians regarding treatment. Investigation of the disease was begun late in 1918, but opportunity for careful study was not afforded because the disease began to subside rapidly about this time.

In the fall of 1919 there was a recurrence, probably as widespread as the outbreak of the year previous. Investigation of the disease was again undertaken with the view of determining what relationship, if any, the organisms variously reported as present in the organs of affected pigs bore to the disease. Rather to our surprise, we failed to recover from any of the animals examined the bipolar organism that had been quite generally credited as being the etiologic factor in the disease. Instead there appeared quite uniformly in stained smears from the blood, the spleen and the lungs a very small coccus which was successfully cultured on Hinton's hormone agar, on blood plates and on chocolate medium.

The first culture secured was from a Duroc barrow that had been thumping badly for two weeks. On autopsy of this animal it was found that the lungs were badly congested and edematous and covered with hemorrhages on the serous surface. Well-developed catarrhal broncho-pneumonia was present, together with slight enteritis in the small intestine, the mucous surface of which was covered with a slimy catarrhal exudate. From the larynx, the bronchial tubes and the kidney of this animal pure cultures of the micrococcus were obtained.

MORPHOLOGY

The organism in primary culture was not more than 0.3 micron in diameter. After numerous transfers on artificial media the size

¹ From the Department of Veterinary Investigation, Iowa State College.

increased to about 0.6 micron. Slightly elongated forms were not uncommon. No tendency to chain or arrange in systemic order was shown. The organism shows no motility. It stains readily with the ordinary stains and is Gram negative, decolorizing very readily.

ISOLATION AND CULTURE

Initial inoculation upon plain agar yielded only scanty growth. On hormone agar the growth is fairly luxuriant, while on chocolate medium and blood agar maximum growth is obtained. The optimum temperature is 37° C. In from 24 to 48 hours colonies on blood agar attain a size of 4 to 6 mm. with an irregular shape and a smooth, glistening surface of a grayish white color, and coalesce rapidly. On agar the colonies are about half the size of those on blood agar and tend to remain discrete. Bouillon is uniformly clouded. Litmus milk shows no change at 24 hours, but after 8 days is acid without coagulation. Indol is produced after 24 hours. The organism is killed by a temperature of 56° C. for 30 minutes. Cultured on sugar bouillon containing Andrade's indicator, the results are as follows:

Reactions on Sugar Media.

	Time	Dextrose	Levulose	Galactose	Mannite	Maltose	Lactose	Saccharose	Dextrin	Xylose
Acid. ...	24 hours	0	0	0	+	0	0	+	0	0
Acid. ...	8 days	+	+	+	+	0	0	+	0	+
Gas ...	24 hours	0	0	0	0	0	0	0	0	0
Gas ...	8 days	0	0	0	0	0	0	0	0	0

PATHOGENICITY

The organism shows a pathogenicity for rabbits, guinea pigs, swine and the donkey, but not for the hen. Intravenous injection of 1 loopful of a 25-hour agar culture caused the death of a rabbit within 60 hours. Swine injected intravenously with 1 agar culture 24 hours old died of septicemia within 24 hours, while those injected with smaller quantities showed the same clinical picture as pigs suffering from a natural infection, dying later, and disclosing on autopsy the same pathological changes as were observed in pigs dying in the field. The hen proved highly resistant to infection, showing no effect from an intravenous inoculation of two 24-hour agar cultures. Subcutaneous injection of moderate quantities

of culture and feeding experiments with massive doses, together with pen exposure tests of healthy pigs with pigs both artificially and naturally infected, have not in a very limited number of trials produced the disease.

Pigs artificially infected showed on autopsy the same lesions as those dying from natural infection. The following autopsy record is typical:

Typical Record of Pig Artificially Infected

Pig No. 3959, injected intravenously with 0.6 of a 24-hour agar culture December 17, 1918. Died December 21, 1918. Was unable to get on its feet the day following injection. Showed labored breathing and manifested pain when handled. Remained recumbent until death. Highest temperature recorded, 102.6 on December 20.

External Examination.—Bluish discoloration of skin of belly. Froth in nostrils. Rigor mortis marked. No discharge from natural openings.

Digestive System.—Passive congestion of all organs. Sanguineous peritoneal fluid. Marked gastritis with slimy, bile-stained exudate over mucosa of stomach. Congestion of serous and mucous surfaces of small intestine. Dry mucosa and reddened folds of large intestine. Liver slightly congested.

Respiratory System.—Epiglottis, glottis, larynx and trachea congested. Bronchioles filled with reddish yellow frothy fluid. Left lung showed metastatic congestion. Right, in full inspirium.

Vascular System.—Heart stained by hemolyzed blood. Endocardium and chordæ tendinæ covered with petechiæ and ecchymoses. Spleen slightly enlarged and dark bluish red, edges rounded.

Lymphatic System.—Lymph glands swollen, juicy, congested, and with few hemorrhages.

Urinary System.—Bladder reddened. Kidneys slightly congested. Parenchyma firm. Capsule stripped readily. Petechiæ at the base of the papillæ.

IMMUNITY

Pigs recovered from the disease have shown very irregular susceptibility to injections of the organisms following their recovery, some succumbing to large doses intravenously, others showing no effect. The test for agglutinin in the blood of sick and recovered pigs showed little or none present in dilutions above 1 to 20. The blood of one pig infected by intravenous injection of 0.9 agar

culture showed, after two months' sickness, an agglutinating titer of 1 to 320. A hen that received six weekly intravenous injections totaling 5 agar cultures showed an agglutinating titer of 1 to 1,280.

SUMMARY

A small Gram-negative micrococcus has been isolated with marked regularity from a number of swine suffering from broncho-pneumonia, so-called "flu."

Intravenous injection of large doses of the organism into swine and intraperitoneal injection into rabbits and guinea pigs have caused death from acute septicemia. Similar injections of smaller quantity of culture produce the disease running a typical course. The pathological changes in animals thus killed resemble very closely those found in swine dying from a natural infection.

Serological tests indicate that agglutinins for the micrococcus are present in the blood of affected and recovered animals in low dilutions and that by systematic immunization these agglutinins may be markedly increased.

ACKNOWLEDGMENTS

I desire to acknowledge the coöperation and valuable suggestions of Dean C. H. Stange, and the splendid help of my assistant, Paul Purwin, for his painstaking laboratory work.

Dr. J. J. Jones has recently resigned from the position of Assistant Inspector in Charge of Tuberculosis and Tick Eradication work on the Bureau force at Jackson, Miss., and has accepted the position of general manager of the Dantzler Farms in Harrison County, Mississippi. These farms comprise more than 100,000 acres, the activities of which are devoted to cattle and sheep raising and general farming. Dr. Jones has been in the service for a number of years and the Bureau loses a valuable and highly trained man; however, his services will still be devoted to building up the live-stock industry. The Dantzler people are to be congratulated for having secured Dr. Jones and we wish him much success in his new undertaking.

Prof. A. Railliet, the eminent French parasitologist and veterinarian, after a service of more than forty years on the faculty of the Alfort Veterinary School, has been placed on the retired list. Prof. A. Henry has been promoted to the chair thus vacated.

GREETINGS TO THE VETERINARY INSPECTORS OF THE BUREAU OF ANIMAL INDUSTRY¹

By VERANUS A. MOORE, *Ithaca, N. Y.*

I WAS asked to read a paper before this section on "The Bureau of Animal Industry, Its Past and Future." I have been so fully occupied, however, that I have been unable to prepare the paper, much as I wanted to do so. I am obliged, therefore, to substitute a few extemporaneous remarks for such a paper.

I would like to say a word about the earlier days of the Bureau, its present work, and possibly a prediction for the future. I think I am the only active member of the Association who was in the Bureau at the time the meat-inspection work was started. I happened to be a member of the first committee, of which Dr. Theobald Smith was chairman, to set the examination for the Bureau of Animal Industry inspectors under the Civil Service Commission. It would not be very complimentary to the veterinary profession to state the percentage of failures among those who took that examination. I will say, however, that a few of them passed.

I do not know of any criterion with which we can measure the advancement of veterinary medicine and education more than by the civil service examination for Bureau inspectors. There were about 60 veterinarians who took the first examination. The results of the second examination were quite a little better than those of the first, and thereafter, so long as I was in the Bureau, they improved steadily, although the percentage of failures was much higher than at the present. Of course the reason for the failures in the beginning was the fact that the inspection required the application of knowledge concerning animal diseases that the veterinarians were not acquainted with nor even had been taught. The practitioners, and they were all the veterinarians that were in the country, knew very little about morbid anatomy, the etiology of infectious diseases, or the relation that exists between the diseases of man and beast.

The meat inspection work in this country began in answer to the demand of the German Government for a Government guarantee of our pork. The first inspection consisted in stamping the boxes in which the meat was packed. That was not acceptable. We then

¹ Address before the Section on Sanitary Science and Police at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

made a microscopic examination for trichinella. The Bureau employed a large force that examined microscopically the sections of flesh that were taken by the veterinary inspectors from the carcasses. Further, the specimens were examined from each hog. The development of the microscope, apparatus for making the examination, that is, the slides for squeezing the pieces of meat, and the designing of a suitable stage, were matters of considerable interest to the Bureau and manufacturers as well. The microscopic examination continued for a few years. When it was found that the trichinella cysts in pork became innocuous after a somewhat limited period in either pickle or dry-salt preservation, this form of examination was discontinued.

The real meat inspection, however, began after the passage of the bill that President Roosevelt signed in June, 1906. This law gave the Secretary of Agriculture, through his veterinary inspectors, authority over the sanitary conditions in the packing houses. From that time to this there has been very rapid progress in the improvement of the conditions under which the work is done as well as in the efficiency of the inspection.

The physical condition of the packing houses in the earlier days was not very acceptable. At least it would not be at this time. The large packing institutions of today began as small enterprises. The packer started with a small slaughterhouse, and as his business extended he built an addition or lean-to, and as the industry continued to grow he built other additions, so that at the time the 1906 law was enacted many of the large packing houses were dark and dingy structures. They extended over a large area, were low between ceilings, were dark because they were so large that sunlight could not get through them, and they were not always kept clean.

The tirade that was started in 1905 against the packing business began by an inspection of the Chicago packing houses by a man representing the London *Lancet*. Then the work of Upton Sinclair created much sensation in this country, and as a result the meat-inspection law of 1906 was passed, giving authority to the Secretary of Agriculture, through the inspectors, to look after the sanitary conditions of the establishments and also the inspection of the meat after cooling and preserving. Before that the carcasses were inspected for disease only. This law providing for the inspection of the meat as it left the establishment has caused, as you know, the condemnation of hundreds of thousands of pounds of meat and meat products that were not considered fit for human food.

I have spent considerable time in the packing houses of the old country. We have heard a great deal about the German meat inspection. While they went into certain details, away beyond what we were doing, I think many carcasses "got by" that would have been condemned in this country. I have felt since that experience that we have no reason to feel ashamed of the work in this country, but rather congratulate ourselves on having a meat-inspection service equal to any.

A few years ago I was requested, together with others, by the Secretary of Agriculture to inspect the packing houses, that is, to inspect the inspectors, as it were. A good many people had criticised the Bureau inspection. As a result the Secretary appointed a committee to visit the establishments and to make a report and such recommendations regarding the inspection as seemed desirable. I was assigned New York, Philadelphia, Buffalo and Pittsburgh. I visited all of the killing places in those cities and nearly all of the process houses. I am frank to say that I do not know of any business where more improvement has been made. Over \$2,000,000 were being spent that year in those cities in the rehabilitation of places for slaughtering animals, handling meat, and equipment. For these better sanitary conditions and more cleanly methods of handling of meat and meat food products we are indebted to the veterinary inspectors of the Bureau of Animal Industry.

You who are in the service may feel a little impatient at times because improvements are slow or because a house does not have the facilities that it would seem it ought to have. However, when one passes judgment on these things, he must take them in their entirety. The improvements that have been made by packing houses in equipment and facilities during the last twenty years has been little less than marvelous. While betterments may seem to come slowly, nevertheless measured by the time these industries are to continue and the difficult problems that the packers, especially the smaller ones, had and still have to contend with, there is every reason to feel encouraged.

At the beginning of the Federal inspection there were a great many food-producing animals. The loss of a few carcasses did not amount to much, and of course, like everything new, there were people who wanted to condemn everything possible. There are those today who say one should not pass a carcass for food in which the smallest tubercle that can be detected with the unaided eye exists or that contains any other lesion whatever. If these opinions were

to obtain there would be, as you know, a great deal more fertilizer than meat coming from the packing houses.

At first there was a tendency to condemn carcasses that were infected but slightly with tuberculosis. In the law under which you are operating the requirements are not so detailed or severe, but rather deal with fundamental principles which are to guide the inspector. You know these principles as laid down in the regulations. I believe in the future there will be still more leniency. Compared with the inspection in Germany in 1905, we are justified in making them so. One saving that is being made is to allow certain carcasses that are on the border line to be sold for food after they are sterilized properly. The introduction into the abattoirs of sterilizers to render such carcasses perfectly safe for human consumption is a step in the right direction. This plan was recommended in 1907 at a conference where B. A. I. Order 150 was being considered. At that time a representative of the packers objected to the introduction of sterilizers because, as he said, it would act deleteriously on the business. Since that time many of the packers have concluded that the sterilizers are a good asset and as a result much meat is saved.

Men who enter a profession, especially the medical professions, do so with the primary purpose of rendering service. Any man who goes into veterinary medicine should understand that he must submit to a life of what has been called "honorable poverty." He is going to receive a salary that is very modest or fees that are not large, and he can not expect to accumulate wealth from his professional work. I do not know where our people are receiving a more beneficial and protective service than by the Federal veterinary and lay inspectors. You should realize that you are each doing your part in helping and improving the conditions of the meat industry and particularly in safeguarding the people against the diseases of animals communicable to man. You should recognize this fact and in a spirit of service be comforted by it.

There is another point that veterinarians in the Bureau should remember, and that is that they are, after all, in the full sense of the word, professional men. The man who becomes a great surgeon, for example, seems to you as inspectors and to me as a teacher to be rendering a much greater service to the world than we are. I was talking not long ago with one of the best surgeons in this country. I happened to be present at a very difficult operation, and after it was over I complimented the surgeon on the operation and

congratulated him on the great service he was rendering. He replied by saying: "We are not doing anything in the way of service as compared with what men who are teaching and engaged in research are accomplishing." So you see the other fellow's point of view.

I learned long ago as a boy in the lumber woods that the pleasant things were not all in one place. We see the sunny side of the other man's position; we do not see always the difficulties. I want to assure you that while continuous routine work may be tiresome at times, and that while you may feel that other phases of veterinary work offer greater opportunities, they all have their difficulties. The burden of an occupation is due to the attitude of mind toward the task as much as anything else. You are rendering a service that will compel eventually the people who consume the meat and who are thus recipients of your service to understand what you are doing for them, and after a time the wrongs, if there are any, will be adjusted. I congratulate most heartily the Bureau inspectors on the public service they are rendering and also on the opportunities they have for study.

I went into the Bureau in 1887, when there were, I think, three men engaged in scientific work outside of the Chief, Dr. Salmon. At that time his administrative duties had become so pressing that he had very little if any opportunity for research. The law establishing the Bureau provided that at no time should the personnel of the technical workers exceed twenty men. That has been changed. Now there is a large number of veterinary inspectors employed in packing houses; in the eradication of the cattle tick; in the quarantine service; and in tuberculosis-control work. A great army of workers has grown up and there are demands for many more. The eradication of foot-and-mouth disease and of contagious pleuropneumonia of cattle stand out as great monuments to veterinary service in the Bureau.

There is one other thought I wish to emphasize and I will close. It is that Bureau veterinarians belong to the veterinary profession. You do not want to feel that you are tradesmen. You want to keep the professional spirit alive and active all the time. The world for us is what we make it, and opportunities in inspection service are not of small proportions. Those on the outside see them. Perhaps if they were working inside they would be too weary with the routine to distinguish them. I want to tell you, men, that if you look to those who have succeeded you will find they have risen above the

average because they had a vision and were willing to do hard work.

There are a great many things in the inspection service that can be improved. However, there is no man that can come in from the outside and make these changes. I had that impressed very forcibly upon me at the time I was making the inspections already referred to. I saw many things that I thought were very bad, but when I came to talk with the chief inspectors and sometimes with the owners of the plants they brought out facts that were fundamental in the situation that I had not seen at all. The advancement of the service is to come from within. Progress is through evolution and not revolution. Every one of you has the opportunity to advance the work in some particular, and in doing this you should be happy. You want to be doing those things that will keep the mind as well as the body active. Someone has said, "He has achieved success who has lived well, laughed often and loved much; who has gained the respect of intelligent men and the love of little children; who has filled his niche and accomplished his task."

I tried to point out in my address the other morning that we have distinct groups of veterinary service. They are the teachers and the research men; the practitioners; the State live-stock sanitarians; Army veterinarians; and Federal veterinary inspectors. There is a special function for each of these groups, and when they are taken together they touch all of the health and sanitary problems that affect the animal industry of the country. This profession is of the first importance economically to the nation in safeguarding the production of dairy products, meat and leather. It is also of significance from the sanitary point of view. In this you are playing a very important rôle.

I am wearying you with a talk more or less irrelevant to the subject assigned. However, I want to assure you that I appreciate the privilege of speaking to the Bureau inspectors. I started with the Bureau when its laboratory was up in the attic of the main Agricultural building. No one dreamed in those days of the magnificent laboratories it now has in Washington and of the large number of men engaged in the work. The growth has taken place during the last thirty years. What the development will be in the next thirty years no one dares predict. I am confident, however, that it will be along lines of better protection to the live-stock industry of the country.

Again I congratulate you upon the very important service you are rendering to the public.

SOME NOTES ON CONTAGIOUS ABORTION

By G. E. JORGENSEN, *Clermont, Iowa*

THERE is no disease rampant among the dairy and beef cattle in this country that is more difficult and more unsatisfactory to treat, both from the aspect of the veterinarian and the stockman, than contagious abortion. In the first place there are no adequate laws for the control and isolation of infected animals, nor has the proper interest and coöperation been shown by the stockman. Herds have become infected heretofore and no special attention given the aborters except to rebreed them. Individuals failing to expel the afterbirth were in many cases allowed to go until the retained afterbirth had rotted away. Animals from infected herds have been sold widespread. Neighbor cows have been allowed to be served by infected bulls. This has resulted in a rapid spread of the disease, with the result that contagious abortion is found in almost every community.

The writer has for years been making a special study of this disease and its treatment, and it has been his experience that fairly satisfactory results may be obtained if the following rules are carried out:

1. Whenever a continuous chain of abortions occur in a herd contagious abortion should be suspected and the diagnosis verified by the isolation of the *Bacterium abortus* Bang, which is considered the causative agent, and by the agglutination test of the blood of the suspect.

2. Once the diagnosis has been made, careful isolation of all aborters in separate and distant stalls from the other animals should be carried out and all discharges, soiled bedding, afterbirth and fetus burned.

3. All aborters should be given the proper treatment indicated for that individual case. That is, afterbirths retained should be treated, and subsequent acute or chronic inflammation of the womb, tubes and ovaries overcome before the animal is rebred.

The writer makes it a practice never to allow a patient to be served until three weeks after all pathological discharges have stopped. While there is some question among the veterinary profession as to the value of bacterins, the writer has by experiments on a number of animals demonstrated that the opsonic index is raised and the agglutinating power of the blood increased by several

increased dosage injections of killed suspensions of the *abortus* organism, hence, inasmuch as no harm can come from the use of them, he is using them pending the absolute proof of their value or non-value.

A recapitulation of the above three rules of treatment follows. The diagnosis of this disease does not and should not seem difficult. The recurring chain of abortions in itself is almost positive and conclusive evidence of the presence of the disease. It, together with a positive agglutination test (over 1:100 dil.), is considered by the writer as indisputable evidence of the presence of the disease. The presence of the *abortus* organism is also of importance, although I would not consider it positive for the reason that I have in four different animals been able to demonstrate the *abortus* organism in animals that did not abort and were not members of an infected herd at that time.

By isolation we mean placing the aborter in a stall or pasture to which no other members of the herd under any circumstances could gain access. Here the animal remains until all signs of inflammation and discharges have abated, and to make it still more safe we add three weeks more to this quarantine. Careful attention is given to disinfection of the premises and of the attendants, who are instructed to care for these animals after all the others have been attended to and then only after donning a suit of clothes used only around these patients. Strict adherence to this is insisted upon.

Treatment consists of the ordinary gynecological procedures which are indicated for each individual case. Retained afterbirths are cut off so that no part protrudes from the vagina, and daily irrigations of the uterus with a normal salt solution done, until the afterbirth is gradually loosened from its attachment to the cotyledons. This usually obtains on the third or fourth day. However, some of these cases are very tenacious and it is almost impossible to remove them except by allowing them to liquefy gradually. In such cases the necessity of daily irrigations to remove accumulated products of putrefaction to prevent the absorption is obvious. Furthermore, we use in these cases a 5 per cent solution of chlorazene to aseptisize as much as possible the uterus and contents. This is a long and tedious process. However, I would rather do this than to do a manual removal of part of the afterbirth as done heretofore. I say partial for the reason that I defy anyone to go out and remove every bit of the placenta in those cases where it clings to the cotyledons with a grip of inseparable tenacity. All that is

gained by such a process is part of the placenta, while many or a few cotyledons, as the case may be, are torn off, lacerated or otherwise damaged, leaving an avenue of infection for secondary invaders with a subsequent septic endometritis, acute or chronic, depending upon the virulence of the organisms involved, followed by a gradual pathological change in the uterus and its glands, and in some cases pyo-salpingitis with occlusion of the tubes, and even an attack upon the ovary itself.

After the uterus has been emptied of the placenta the irrigations are given at three-day intervals. In doing this we use a speculum and uterine forceps, drawing the cervix backward until we are able to insert a return-flow catheter, and from 2 to 6 gallons of sterile normal saline solution is allowed to flow into and out of the uterus. In certain conditions where astringents or mild antiseptics are indicated by the condition of the uterine mucosa they are used; however, we are not in favor of shotgun mixtures in the form of capsules, believing that the less chemical irrigation we cause the better are the chances of aborting inflammatory changes in the uterus and subsequent sterility.

It would be fitting to mention here those conditions of the ovaries occasionally seen causing symptoms, as inability to conceive, nymphomania, etc. These symptoms are usually due to cysts, generally with sterile contents and probably due to unruptured Graafian follicles or to unabsorbed corpora lutea. They may be palpated through the rectum and usually ruptured with the hand. I have examined a number of them for organisms, but have never been successful in demonstrating any organism either by smears or by inoculation of media.

Returning to the treatment of true contagious abortion, I find that those cases that develop extensive inflammatory conditions are usually sterile when the inflammation subsides, due to the changes in the uterus. However, as Dr. De Vine points out, the infection and pyometria following an abortion are not due to the *Bacterium abortus*, but to secondary invaders. In my experience I have found that in the majority of cases the *Bacterium pyogenes bovis* and a low-virulence form of the *Staphylococcus albus*, together with a few colon organisms, are the offenders. In those few unfortunate individuals where we find the *Streptococcus pyogenes* present the result is invariably death from a general sepsis in two or three days.

By considerable work along experimental lines we have demonstrated to our satisfaction that administration of the suspensions of

killed *abortus* organisms raises the opsonic index and does increase the agglutinating power of the animal. Basing our action on this, we use this product in the treatment of these cases.

In conclusion, we have as our goal in the treatment of this disease, first, the prevention by sanitation and isolation; secondly, the curative treatment of those aborting, to the end of overcoming the secondary infection following such abortion for the purpose of preventing sterility, and thirdly, a gradual building up of an active immunity in the animals comprising the infected herd.

FATHER GOOSE ON SHEEP PARASITES

If stomach worms affect your sheep,
Copper sulphate treatment's cheap.

If you see your sheepie scratch
And rub and bite and kick,
It's time to dip the little cuss
And kill the louse and tick.

Little Bo-Peep, come blow your horn,
Your sheep have the scab, just as sure as you're born.
Get the lime-sulphur and clean out the vat,
And we'll save the old sheep and their wool, mutt'n fat!

"Baa, baa, black sheep! Have you any wool?"
"Yes, sir! Yes, sir! Three bags full.
I haven't any maggots, and I haven't any itch,
And if I dodge the stomach worms, you'll all get rich."

A bladderworm lived in the brain of a sheep,
And the poor sheep had the gid;
So he walked around in a circle—
And that was all he did.

A tapeworm named *Tænia* lived in a dog,
And down where he lived it was dark as a fog.
He had no eyes and he had no legs,
And his tail was full of cute little eggs.

—M. C. H.

THE INFLUENCE OF THE HEALTH OF THE CALF UPON ITS FERTILITY AT BREEDING AGE¹

By W. L. WILLIAMS, *Ithaca, N. Y.*

THE problem of reproduction in cattle (and in other domestic animals) is one of constantly growing importance. In pedigreed cattle the condition is critical and seriously imperils an adequate milk and meat supply. At present, as it has been in the past, the chief study regarding interferences with reproduction is being concentrated upon the pregnant animal and means sought to insure birth and to obviate the interruption of pregnancy by abortion. More recently serious attention is being given by some to the problem of nonconception, and in the judgment of some veterinarians the time has arrived for consideration of the influence of the health of the calf upon its fertility as an adult. The scope of study is thus broadening until now it involves essentially the whole span of life.

The average pedigreed cow, so nearly as I can estimate, reaches an age of about 6 years, conceives four times and calves three times. She is pregnant about 47 per cent of her life and nonpregnant 53 per cent. The dairy cow yields milk about 44 per cent and is dry or unprofitably in milk 56 per cent of her life.

The pregnant state is not a propitious time to influence directly the health of the pregnant uterus or of the contained fetus, because the physiologic uterus during this period is hermetically sealed so that its interior and the fetus are not approachable except at great peril. The fetus can not be reached indirectly through the blood stream. The placenta constitutes the most efficient filter known. When healthy it bars all known bacteria, toxins and antibodies and does not permit the passage of the most highly soluble dyes like the anilines. Infections existing within the pregnant uterus or in the fetal body or its annexes are not, therefore, available for attack. So far as known, no substance introduced into the body fluids of a pregnant animal is thrown into the utero-chorionic space to affect favorably or unfavorably any infection resident there. Clinical observations support the belief that antiseptics, sera, bacterins or other agents used to overcome infection do not reach nor directly affect infections existing within the uterus or fetus.

Under these conditions it is not strange that some investigators

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

and practitioners are seceding from that group which would limit activities to the pregnant state and are achieving valuable progress in their work with nonpregnant animals. They are finding that infections resident in some portions of the genital tract are open to direct attack under well-known surgical principles, and that the employment of available means during nonpregnancy decreases the sterility, lowers the rate of observed abortions, tends to obviate metritis and placentitis, and advances the number and vigor of calves born. The successful invasion of this field has broadened the area of activity more than 100 per cent.

There remains, however, an important era in the lives of animals which has been largely ignored in so far as reproductive efficiency of the individual is concerned. If a calf dies its loss is recognized, but if it is diseased and apparently recovers little attention has been paid to the possible effect of the disease upon its reproductive efficiency at breeding age. The period elapsing between birth and breeding is usually 15 to 20 months, or 21 to 27 per cent of the average life of the animal. It is a period in which there is much peril from chronic infections. It is of concern in relation to any chronic infections of intra-uterine origin and of post-natal infections from milk or other foods. My contention has long been that in the great problem of reproduction conscientious and earnest study should be given to the health of the individual from the fertilization of the ovum to the end of its life. The practitioner of human medicine prevents much gonorrhea by disinfecting the eyes of newborn infants and watches with concern for the advent of signs of syphilis from intra-uterine invasion. If he can not control the infection here, then the outlook for control at other periods is very dark.

The infections of the genitalia of animals which interfere with reproduction have been largely ignored during all periods except pregnancy, chiefly if not wholly because of the rigid and narrow belief that they can exist and are destructive in the uterus only during pregnancy. In 1912 I first ventured to express the opinion that the health of the young calf directly affected its reproductive efficiency as an adult. Naturally this view aroused very scant interest amongst either breeders or veterinarians. The belief was entirely too heretical for any orthodox adherent of the "contagious abortion" hypothesis as then understood.

The questions involved are extremely complicated and demand far more research and observation before a true and satisfactory

conclusion can be reached. The evidence now on hand, however, seems to me ample to justify its presentation for discussion.

Veterinarians and breeders have naturally agreed that the health of the calf should be guarded from the standpoint of peril to its life, and also that disease should not interfere seriously with growth. In the researches conducted by my department regarding the infections of the new-born, two lines of thought have been kept side by side. It has been aimed to discover how these infections may be most efficiently controlled in relation to the immediate welfare of the calf; and to determine, assuming a relationship between the health of the new-born to its later breeding efficiency, how the calf may be best reared in order to secure the highest efficiency later as a breeding animal.

The two objects cited rest upon many fundamental questions which need to be decided as far as possible before dealing with the final problem. In the first place, it is essential to know how early in the history of an individual it may become infected and its existence or health placed in peril. It is next to be determined how long an infection, which has failed to cause the prompt death of the individual, may be able to persist and to continue as a peril.

It is not aimed here to discuss any one bacillus or other micro-parasite directly, but to consider infections of the reproductive organs generally. It will be convenient at times to designate certain named organisms, but that is merely for clearness. The term "contagious abortion" will not be used. When the term "abortion" is used, unless expressly stated otherwise, it will mean that the fetus has succumbed directly or indirectly to infection and that the cervical end of the uterus has suffered from an endometritis due to an infection which caused the uterus to contract and expel the fetal cadaver. No effort is made to designate the infection causing the fetal death or its expulsion by the uterus.

There is no moment in life over which the cloud of infection fails to cast its shadow. In the brief, independent existence of ovum and spermatozoon, infection is commonly present and menaces their lives. The researches of Day, Hagan and Carpenter have demonstrated clearly that the cervixes, uteri and oviducts of a majority of nonpregnant cows and heifers carry infections. Clinically it is these infections which destroy the spermatozoon or ovum or both prior to fertilization or at too early a stage for the recognition of conception. These infections in the genital tract are by no means transient. If they endured for a short time only, they

could be only rarely recognized by cultural methods. Instead they are so common that the infection is evidently extremely chronic and exists at every age thus far investigated. In sterile heifers, when the sterility is not due to arrest in the development of the genital organs, Carpenter has not failed to find bacteria culturally in the uterus or oviducts.

Conception fails to eliminate resident infection from the genital tract. Quite on the contrary, the advent of an embryo with its annexes in the uterus accelerates bacterial growth of any infections within the genital canal. The delicate embryo has no power to resist bacterial invasion, and the power of the infected uterus to protect the contained embryo is too feeble, if it exists at all, for definite recognition. It then becomes a trial of power between the infection on one hand and the uterus and contained fetus on the other, whether the pregnancy shall proceed in orderly manner and birth occur, or whether the pregnancy shall be interrupted by abortion, by death and maceration or mummification of the fetus, by premature birth or by birth at full term associated with evident placentitis or metritis. The researches of Hay, Hagan and Carpenter, showing that most pregnant uteri of cows and heifers carry infection, show clearly and emphatically that the infections of the genital tube in nonpregnant and pregnant cows are continuous and identical.

Such genital infection does not end with pregnancy. After abortion or calving there is so commonly a scarlet discharge from the genital tract that Fleming speaks of it as normal and terms it "lochia." In many herds one may readily recognize clinically pus in the uterus or cervix of 20 to 75 per cent of the cows 6 to 12 months after calving or aborting. It is thus firmly established that infection of the genital tube exists in a large proportion of cows and heifers, and that the infection is continuous from the pre-conceptional era of the heifer, through pregnancy, into and through the post-parturient period. Naturally the infection varies. Now one and then another species of infection may preponderate or dominate. Perhaps some of them are mutually repellant and a dominating form destroys a certain type. It is stoutly insisted by Schroeder and others that *Bacillus abortus* disappears from the genital tract soon after the close of pregnancy. Certain it is that most bacteriologists commonly fail to get cultures of *Bacillus abortus* from the uterine cavity comparatively early after the close of pregnancy. Bang also believed that pregnancy was a prerequisite

to the multiplication of *Bacillus abortus* in the uterine cavity. Whether these views are correct or not it is difficult at this time to judge finally. It may be that in quantity and virility the bacillus becomes impossible of cultural detection and yet persists. At least clinical experience indicates:

(1) The persistence in the uterus of *Bacillus abortus* or of some other organisms causing abortion, metritis and retained placenta in cows year in and year out. All recorded data show that cows which have suffered from abortion, retained afterbirth or metritis tend either to become sterile or to suffer again and again in succeeding pregnancies from the metritis of their first disaster.

(2) The recurrence of the metritis in severe form causing abortion, retained afterbirth, etc., is attributed to reinfection from the udder. Schroeder apparently was the first to suggest such a probability or possibility. Recent researches have shown abundantly the common and persistent invasion of the udder by *Bacillus abortus*, but it is difficult, if not impossible, to show directly and clearly that the bacillus migrated from the udder to the gravid uterus. It must be granted, however, that it is possible, and just as possible as is the infection of the pregnant uterus by the mouth or vagina. If *Bacillus abortus* can penetrate the undamaged alimentary or vaginal mucosa and thence reach the sealed utero-chorionic space through the blood stream, then it must with equal facility penetrate the lacteal mucosa. There is at present no reason to believe that other bacteria commonly occurring in the genital tract anterior to the vagina may not be able to reach the parts through the same avenues and at the same times as *Bacillus abortus*.

It appears to be satisfactorily shown that *Bacillus abortus*, once it has invaded the organs of a cow, tends to persist year after year apparently without end. While it is denied by Schroeder and others that it persists in the genital tract for a prolonged period, that is immaterial so long as the same investigators hold that it persists in the mammary gland and from that focus reinvades the gravid uterus. Schroeder, Buck and others have likewise shown that *Bacillus abortus* exists in long-standing lesions in the vesiculæ seminales and epididymes of bulls.

If *Bacillus abortus* can persist indefinitely, whether within the genital tract itself or in some other organ (mammary gland), and periodically reinvade the uterus, it is fair to conclude therefrom that other bacteria yet more commonly and abundantly found in the genital tract may have a similar history.

It is fairly safe to say that it is generally agreed that there are but two important and plausible natural avenues of infection of the uterus of the cow or other mammal. The one plausible direct avenue of infection is that resulting from copulation, the invasion occurring through the open cervical canal. In pregnancy this avenue is closed by the uterine seal. The one important and logical indirect avenue of infection is through the digestive mucosa.

Invasion through the vaginal mucosa seems highly improbable because, aside from copulation, there are few natural opportunities for contact. It is highly improbable that a nonmotile organism which is not known to multiply upon the surface of the skin would pass the vulva, come into contact with, and be absorbed by, the vaginal mucosa and thence reach the uterus with sufficient frequency to constitute a notable peril. The hypothesis that natural infection of the uterus via the vaginal mucosa is either frequent or important is not supported by recorded facts. The hypothesis, originated by Schroeder, that *Bacillus abortus* frequently invades the gravid uterus from the mammary gland has a degree of plausibility which is being heightened by research. The bacterium is common in the udder, and if it may invade the uterus by penetrating any mucous surface in the body there is no reason why it should not invade the blood stream from the udder. This may account, as Schroeder alleges, for some intra-uterine infections. In turn, the mammary gland may become infected through transmission from cow to cow by the milker. Other mammary infections are well known to be thus transmitted. But the suggestion of Schroeder that *Bacillus abortus* is transmitted from cow to cow by the milker fails to explain infections at the one supremely vital point. The most ruinous infections in large pedigreed herds occur in heifers in their first breeding year. These heifers have not been milked, their udders are not handled, and largely they have not been in contact, except as young calves, with milking cows nor with persons who milk cows.

The third indirect avenue of invasion is that through the alimentary mucosa. This avenue Bang urged as being of extreme importance. McFadyean and Stockman and others have emphasized Bang's conclusions upon this point.

More recently I have proposed an invasion through the same avenue at a wholly different era in the life of the animal. The claim of Bang and his supporters is that the invasion through the digestive mucosa occurs through the ingestion of *Bacillus abortus* by the pregnant animal. His belief that *Bacillus abortus* can invade

the uterus only when it contains a fetus, if proven, would be highly important in some respects but immaterial generally. If *Bacillus abortus* can invade the vesiculæ seminales of a bull and acquire a permanent habitat there, it can invade a nonpregnant animal. It may find a habitat in the udder, and, as Carpenter has shown in one case, it may invade the udder of a heifer which has not conceived nor lactated. Its invasion of the dormant mammary gland which has never functioned indicates that there is no limitation as to how early such invasion may occur.

The udder having been invaded and the infection having acquired a habitat there, the secondary invasion of the gravid uterus may occur therefrom at any future date. But it is not essential that the habitat of an invader of the uterus shall be in the udder. If *Bacillus abortus* can invade the uterus from the digestive tract, there is no known reason why it may not persist in the alimentary canal. Practically all investigators recognize *Bacillus abortus* in the digestive tracts of abortions, where it has evidently lived and multiplied, and there is no known reason why, if it multiplies in the fetal intestinal tract and can be artificially grown in milk, it should not readily grow in the gastro-intestinal tract of a milk-fed calf and become a permanent dweller there. Such appears to be clearly true of that race of the colon bacillus commonly regarded as the chief or sole cause of calf scours. The bacillus lives in the uterus of the cow, in the digestive tract of the embryo and of the calf, and apparently in the digestive tract of the adult.

The researches of Hagan and Carpenter in collaboration with me have shown with perfect clearness the continuity of infection of the nongravid uterus, the gravid uterus, the fetus and the calf. It is satisfactorily clear that an infection within the utero-chorionic space penetrates the chorion and, reaching the amniotic fluid, is swallowed by the embryo. This holds with *Bacillus abortus*, the colon bacillus believed by Nocard, Moussu and others to cause abortion in cattle, the vibrio described by McFadyean and Stockman and by Theobald Smith as a cause of abortion in cattle, and by McFadyean and Stockman and by Carpenter as causing or associated with abortion in ewes. In other words, each and every microparasite discovered in the utero-chorionic space in the cow has also been recognized in the digestive tract of the fetus concerned, and, if it is born, the infection persists after birth. The opportunity for swallowing infection does not cease with birth. The milk commonly bears *Bacillus abortus*, and other bacteria also are present. Infec-

tion in large volume may reach the milk from the genital organs by extra-mammary contamination. When large quantities of virulent material are being expelled from the uterus, great care is essential if contamination of the milk is not to occur, and it must be admitted that any infection which, when swallowed by a fetus, endangers its life, must have an analogous danger when ingested by a new-born calf.

It is generally believed that abortion is largely caused by the taking of infection into the stomach of the pregnant female with her food. But the epithelium of the alimentary tract, if healthy, is intact and highly resistant to bacterial invasion. It is quite different with the new-born calf. It commonly has either diarrhea with profuse exfoliation of the digestive epithelium or it suffers from pneumonia with exfoliation of the respiratory epithelium. Without notable dysentery or pneumonia, a vast majority of dairy calves, where sterility and abortion are most severe, suffer from lesser disturbances of digestion. The hair becomes rough and dry, the feces adhere to the tail and buttocks, the calf is gaunt or pot-bellied, its growth is slow and vigor is lacking. The hairs about the urino-genital orifices of both sexes quickly become matted and stained black, to remain so throughout life. I have been led to believe that calves thus handicapped were greatly endangered by the invasion of chronic infections from the alimentary tract or from the lungs while the alimentary and pulmonary muscosæ were badly diseased or destroyed. This appeals to me as being far more plausible than invasion from the healthy digestive tract of an adult pregnant animal.

Probably the strongest objection to this view is the lapse of time between birth and breeding age. After a calf has reached 3 to 4 months of age, if it enjoys an ample food supply, it throws off the appearances of ill health, recovers its vigor, and from that time on, for 20 to 24 months, enjoys what is apparently the most healthy period of its life. Hence most persons refuse to believe that such an animal harbors an infection ready to cause disaster when pregnancy occurs. They must not forget, however, that not all such animals await pregnancy before showing disaster. In some groups of heifers each individual may conceive at the first copulation, but this is not always so. In large dairy herds where abortion, sterility and white scours are severe and continuous, many heifers require several or many copulations before pregnancy becomes established. Then if the total copulations required to accomplish fertilization

in the entire group which have conceived be divided by the number of heifers, the result will give a reliable prophecy of the rate of abortion, premature birth and metritis to ensue. That is, the more frequently a heifer must copulate, the greater the peril of her eventual conception. This can not be explained by exposure during pregnancy, but must be referred to the virgin period of her life. Not all heifers breed, however, and finally after prolonged efforts most pedigreed herds suffer losses of 5 to 10 per cent in permanently sterile heifers which have anatomically normal genital organs. Autopsy reveals infection in the cervix, uterus, oviducts and ovaries as the cause, and this must have been present prior to copulation or pregnancy would not have been prevented. These infections are frequently beyond correction. The vagina, cervix and uterus may be largely disinfected, but the ovaries and oviducts are well beyond the surgeon's reach. So in one heifer long under treatment and with blood strongly agglutinating *Bacillus abortus*, autopsy by Carpenter gave negative cultures from the cervix and uterus, streptococci from the oviducts, and *Bacillus abortus* from the mammary gland which had not functioned. Pregnancy was not essential to infection in either udder or oviduct, and the streptococcic or other infection must have been present at the first copulation to bar fertilization.

At this point theories clash. Most writers say that abortion is a chronic infection but fail to define "chronic." They then largely give to the disease characters not common to chronic infections, as I understand them, especially by attributing to the host the power of creating an unqualified immunity. From my viewpoint a chronic infection is one which is capable of existing indefinitely in a host without necessarily destroying its life or even causing recognizable disease. It may assume at any time a virulent course and render the host seriously or fatally ill. Or the host may gain a definite ascendancy and finally either apparently or actually recover. But the same infection may at any time reinfect the host, or while the infection is present superinfection may occur and add to the peril. Such a conception is in irreconcilable conflict with any idea of unqualified immunity. There is built up in some cases, it is true, a certain power of resistance to the destructiveness of the infection, but not sufficient frequently to eradicate it from the body or to prevent reinvasion in the future. Under such a conception if the infections which cause sterility or abortion in adults invade the newborn, there is no reason why they should not persist up to the

breeding time to interfere with reproduction. In our researches the blood of virgin heifers in severely infected herds not infrequently reacts strongly to the agglutination test for *Bacillus abortus*.

Schroeder and others assert that in the adults *Bacillus abortus* may and does live far longer in the organs of cattle than the time comprised between birth and breeding age. Jensen and other writers upon white scours of calves believe it due to an organism common in the intestinal tract of adult cattle but pathogenic for new-born calves only.

The theory of immunity held by many for *Bacillus abortus* would, if proven, render a reinvasion of the fetus or calf by that organism impossible, and, if the animal survives, the immunity would be of distinct economic importance, but clinically the reverse is true. The higher the rate of sterility and abortion amongst the adults of a herd, extending over a series of years, the lower the reproductive efficiency of heifers grown in the herd without special precautions.

Accurate clinical data, wholly free from objections, are exceedingly difficult to obtain regarding sterility, abortion and other bars to reproduction. These infections offer every imaginable variation and every possible opportunity for deception. Sterility, abortion and white scours suddenly loom up from no one knows where, and frequently abate without recognizable reason. If one attempts to cause sterility, abortion or white scours by experimental infection, he may appear wholly to succeed or he may utterly fail and in the end understand neither the success nor the failure. So with supposed cures or preventives. Bauer long ago believed that he controlled abortion by the use of carbolic acid, and no more convincing statistics of the control of abortion with drugs or biologics exists in veterinary literature than those he submitted; yet the veterinary profession at large knows that the alleged cure was a delusion. It is virtually impossible to get reliable statistical data from dairymen and cattle breeders. The ordinary breeder keeps no records, and the breeder of pedigreed cattle keeps to himself any records he may have except the official registration of calves born. It is not consistent with the interests of the breeder of pedigreed stock to publish his misfortunes. The less the public knows about diseases in his herd the higher price he can secure for any surplus stock.

There are, however, some fairly exact clinical data regarding the influence of the health of calves upon their reproductive efficiency as adults.

It may be stated with comparative safety that sterility and abortion during the first breeding year is most common in dairy cattle which are ordinarily fed artificially while young on cow's milk. They notably suffer, while young, from digestive disturbances in which life is endangered and in which the barrier to bacterial invasion constituted by the alimentary epithelium is critically injured.

In those animals which regularly nurse their young, sterility and abortion are no more common in the first than in later breeding years. In horses, sheep and swine, sterility and abortion are apparently not so common in the first as during later breeding years. In an outbreak of abortion in ewes, associated with a spirillum, studied in my department and reported by Carpenter, the storm broke during second pregnancy. There was no known opportunity for extrinsic infection between the successful first and the disastrous second pregnancy. . Apparently it was due to a cumulative action of an infection present during the first breeding year but acquired explosive force in the second. Of course this may not be the true explanation, but so far as I have been able to find recorded, the observation is in accord with abortion in sheep generally, and is, I believe, in equal harmony with other species of animals which regularly obtain nourishment for a considerable time after birth direct from the mammæ of the mother by nursing. Such young animals, as a rule, suffer comparatively unimportant digestive disturbances.

A comparative study of reproductive efficiency during the first breeding year in those species of animals where some of the young are nursed by their mothers, and of others which are partly or wholly fed artificially, with resultant defective digestion, is highly interesting, however superficial the observations may be. Dairy calves are generally fed artificially and suffer severely from gastrointestinal irritation, while common beef calves are usually nursed by their mothers and suffer but slightly from calf scours and pneumonia. According to available data, when the first breeding year is reached, heifers in large dairies, where calf scours and pneumonia have been rampant, conceive with difficulty, requiring an average of two to four copulations; 5 to 10 per cent are hopelessly sterile, and 20 to 30 per cent or more are observed to abort. The ratio of observed abortions in first and later pregnancies is about three or four in the former to one in the latter.

No recorded data regarding sterility and abortion during the first breeding year amongst common grade beef cattle are available,

but I doubt any challenge of the opinion that it is no more common nor even as common as in animals which have been previously bred. In large dairy herds sterility and abortion become what may be termed as fixed plagues of a grave character, the abortion involving preëminently the heifers, while sterility is most pernicious later. In beef cattle abortion appears now and then as a storm, involving alike all ages or preferably the older animals.

A further study apparently indicates that in large dairies the reproductive efficiency of heifers is profoundly modified by their health as calves. No wholly satisfactory standard for judging the health of calves has been established. The per cent of deaths from calf scours or pneumonia is a very crude and inadequate standard, just as the per cent of observed abortions is a very unreliable index of reproductive efficiency. The per cent of abortions in a herd is necessarily lowered by an increased prevalence of sterility; a sterile cow can not abort. Many animals also with infection in the utero-chorionic space calve at full term, so that metritis and retained afterbirth may be highly prevalent while the rate of observed abortion is low. In grade beef cattle, however, the symptoms of intestinal and pulmonary irritation, so universal in large dairies, are well-nigh absent in many herds, and in these abortion in heifers is infrequent.

According to my observations the general health of calves is reflected in their behavior at breeding age. As a rule the greater the size of a dairy herd the greater the difficulty from calf scours and pneumonia, and parallel thereto, the higher the rate of sterility and abortion in heifers. It is not rare, also, to observe absolute sterility in young bulls due to an infection within the genital organs. In a typical case a highly valuable young bull was absolutely sterile from the first, owing to abscessation of the epididymes. Had the epididymal infection been acquired after he had been placed in service, he should have been fertile in his first copulations. He may, of course, have become infected at any time, either as a fetus in utero or between birth and sex maturity, but the most logical era of invasion was during early calfhood when the resisting power of the alimentary-respiratory mucosa was low and the infection present was great and virulent.

In large dairy herds where sterility, abortion and calf scours and pneumonia are highly destructive, my observations indicate that vacillations in the health of the calves change profoundly the behavior of the heifers. In the Annual Report of the New York

State Veterinary College for 1915-1916, on page 125, a table is given showing the sterility-abortion rate in a group of heifers from Herd A. As calves these heifers were reared in a veritable pest-house; a dark, damp, fly-infested basement. They were fed carelessly from dirty pails, with mixed raw milk from intensely infected dams. The calves were in stalls with lattice partitions so that essentially they were in a common room. Feces and sputum could pass freely through the lattice-work. They suffered severely from white scours and pneumonia. This condition persisted for 6 to 8 years, and the heifers were observed to abort in their first pregnancies at a rate of approximately 50 per cent.

Then a change was made. The calves were given light, well-ventilated, individual stalls with tight board partitions. The feeding pails were kept fairly clean, and the feeding of the calves was given far greater attention. The calves grown under the new system have aborted in their pregnancies at a rate of approximately 8 per cent, or one-sixth as frequently as under the prior plan. So far as can be determined there has been no other change in environment. They occupy the same stables and pastures as heifers as those used by the earlier group. They are bred to analogous herd bulls, the bulls which are used on the adult cows.

On page 136 of the same Annual Report statistical data are inserted from Herd B, indicating in a very marked manner the effect of improved rearing of calves. The abortion rate of 44.1 per cent in the poorly reared calves dropped to 9.8 per cent in the better fed calves. Later the management of Herd B relaxed its efforts and the observed abortion rate rose, but not so high as in 1909-1912. For a second time the care of calves was improved and the abortion rate again fell, but before the results could be fully recorded the herd was dispersed and the observations closed.

Thus far my observations have constantly been that in herds where calves are unthrifty and suffer severely from white scours and pneumonia they breed poorly during their first breeding year. If gastro-intestinal disorders in the calf are mild the heifer is more prone to abort in her second than in her first pregnancy. My observations regarding the reproductive efficiency of swine have also proven highly interesting. They supplement the evidence presented regarding calves.

Several investigators have concluded that abortion in swine is identical with abortion in cattle. The *Bacillus abortus* of Bang is found in aborting cows and in the abortions. According to my observations,

when pedigreed swine are kept in conjunction with dairies and fed largely upon raw cow's milk the reproductive efficiency tends to decrease until finally they cease to be profitable. This is not true in large herds of swine, so far as I can learn, in which cow's milk does not constitute an important part of the diet. So far as I have been able to trace, abortion is not common in swine. Instead, the embryos perish in the uterus and become macerated.

Clinical observations upon one swine herd will serve to illustrate my meaning. On page 94 of the report of the New York State Veterinary College at Cornell University for 1917-1918 I have recorded the virulent degree of genital infections in a large Short-horn herd, designated as Herd F. In conjunction with this herd there is kept a highly pedigreed herd of Berkshire swine. The foundation stock came from a highly fashionable swine herd kept in conjunction with a celebrated herd of pedigreed cattle.

The sows of Herd F nursed their pigs in the ordinary way, and as early as the pigs would take it an abundance of milk from the highly infected cows was added to their diet.

The reproductive efficiency was low from the beginning and gradually decreased until the herd was decidedly unprofitable. There was little abortion in the ordinary sense. There were many weak pigs which died, and along with pigs some dead cadavers were observed. Perhaps only a small portion of the dead cadavers were noticed, as the sow would tend to eat them at once with the fetal membranes. The greatest bar to reproduction was sterility. The blood of some of these agglutinated *Bacillus abortus* strongly. Agglutination with other bacteria was not tried.

In response to inquiry I advised the substitution of boiled for raw cow's milk for all ages of swine. This resulted in three groups of swine as related to the feeding upon raw cow's milk:

- A. Sows fed throughout their lives on raw cow's milk.
- B. Sows fed for a time upon raw and later upon boiled milk.
- C. Sows bred upon the premises and in which all cow's milk fed was boiled.

The results, according to data furnished by the establishment, are as follows:

Results of Feeding Sows With Raw and Boiled Cow's Milk.

ITEMS	GROUP		
	A	B	C
Number of Sows.....	11	25	8
Breeding months in herd.....	131	438	92
Healthy pigs born.....	100	207	107
Weak pigs born.....	28	43	4
Cadavers expelled.....	5	39	2
Per cent healthy pigs.....	76.3	71.4	94.7
Per cent weak pigs.....	20.7	14.9	3.6
Per cent cadavers.....	3	13.7	1.7
Average months required to produce one healthy pig	1.28	2.11	.85

So far as can be determined, but one element has entered into the change in efficiency besides that of the preparation of the milk for feeding. About six months after changing from raw to boiled cow's milk there was a decrease in the rations allowed the sows and hence they were kept thinner in flesh. It can not be denied that this would affect favorably the result.

On the other hand, there are two facts which tend to negate any belief that the decreased ration to the sows caused the increased fertility or contributed largely thereto: (1) A number of sows in Group B had been highly fed and later the ration was decreased, but instead of their fertility advancing, it retrograded so that the last two sows of Group B to farrow produced one live pig. (2) A number of sows belonging to Group C were fed highly for a considerable time before the rations were decreased. At this point Groups B and C overlapped, and at the time the two sows from Group B, just mentioned, farrowed, 9 sows from Group C dropped 93 pigs, of which 81 lived. It therefore seems to me clear that the reproductive efficiency of the sows has been profoundly increased by a radical change in the feeding of the sow pigs.

Contributions by French veterinarians to the fund for the relief of French and Belgian members of the profession rendered destitute by the war have amounted to 77,856 francs. In reference to contributions from English veterinarians and from the American Veterinary Medical Association, Professor Vallée, chairman of the French committee, writes to a French veterinary journal as follows: "The very generous aid of our English and American confreres will awaken in the French veterinary profession a unanimous and cordial gratitude."

OBSERVATIONS ON AMYLOID DEGENERATION IN DOMESTICATED ANIMALS¹

By HERBERT L. GILMAN, *Ithaca, N. Y.*

IN man, amyloid degeneration has been quite thoroughly worked out, particularly with reference to the changes found in syphilis, tuberculosis and other chronic diseases. In animals, however, as evidenced by the small amount of available literature in the English language, little has been done in this country on this subject. Foreign workers, on the other hand, have carried out extensive researches along this line, but unfortunately such literature is inaccessible to those who do not read foreign languages, except in so far as this work has been translated by others. In view of these facts an attempt was made to review the available literature on the subject, including recent researches, and to make observations on the changes produced in the various organs of the domesticated animals, with some reference to their relative frequency of occurrence. These observations were made over a period of a year on animals autopsied at the New York State Veterinary College, Cornell University.

Amyloid degeneration, according to Ziegler, is a peculiar degeneration of the connective tissue of the blood vessels, characterized by a deposit of an albuminous substance (amyloid) in the affected part, so that the tissue acquires a peculiar glassy, homogeneous appearance. Bailey refers to it as a homogeneous, solid, infiltrating substance, differentiated from substances closely allied by its peculiar staining reactions.

It is generally agreed that amyloid is not a true specific chemical compound, but consists principally of chondroitin-sulphuric acid, which is its most constant constituent, and a protein base which is somewhat variable in character. Jacob, however, states that recent chemical analyses have demonstrated several cases in which substances giving the reaction for amyloid did not contain this acid. Chondroitin-sulphuric acid is found normally in many different tissues such as cartilage, elastic tissue, especially of the aorta and ligamentum nuchæ, spleen, and the supporting tissue of many glandular organs, a fact which may account for the deposition of amyloid in so many tissues. He also suggests that under the action

¹ From Department of Pathology and Bacteriology, New York State Veterinary College, Cornell University.

of chronic bacterial toxins and other agents the protein derivative and other products of protein decomposition become unusually available, and by the interaction of a ferment, amyloid is formed. Bailey states that we have blood destruction, cell necrosis and fibrosis associated with amyloid, and that its deposition may be the result of destruction of cells, or both may be independent results of toxic action. Mallory believes that it is not a product of degeneration of cell or fibril, nor is it something filtered out of the bloodlike serum, but an abnormal product of the fibroblast. With this he calls to mind the normal occurrence of the chondroitin-sulphuric acid in so many tissues of the body.

Microscopically, amyloid is to be differentiated from several substances which resemble it to a greater or less extent. Among the more important of these might be mentioned the products of such degenerations as mucoid, colloid, elastoid and hyaline. The first has its special staining reactions and individual characteristics and is not very difficult to differentiate. Colloid, while taken by some to be a specific, definite substance, is used as a collective term by others, as Ziegler, who applies it to a great variety of formations that possess only certain physical attributes in common. He also quotes one author (Von Recklinghausen) who places mucus, amyloid and hyaline under this type. As a whole, it is not a definite chemical entity, and since its staining reactions do not differentiate it clearly from certain other hyaline substances, it seems best (Ziegler) to apply the term only to those hyaline products of epithelium which do not possess the characteristics of mucin.

Elastoid degeneration is a rather closely related process, consisting of a softening of the colloid material in elastic fibers which have lost their specific character and no longer react to the special stains. It is differentiated by the fact that it is found in the elastic fiber, stains faintly or irregularly, and remains of elastic fibers may often be found within it.

In the differentiation of hyaline from amyloid one frequently meets with much difficulty, especially in the newer deposits, and this question is the subject of much discussion. The term hyaline, though sometimes taken to mean a specific degeneration product, signifies rather an appearance simulated by a variety of substances. So in differentiating these two it would seem best to term as hyaline such substances which simulate amyloid but give negative reactions to its stains. Even then we have much difficulty, as the two substances seem to be closely related, there being no clear line of distinction

between the two. Both are found in the same places and have about the same microscopic appearance in sections stained by ordinary methods. Koltz and others regard amyloid as a changeable and unstable compound having a protein base very similar to hyaline. This view is supported by the fact that very frequently the homogeneous substances found take the stains for amyloid well, while in other cases the reaction is weaker and weaker, down to the true hyaline.

Bailey states that it seems to be the consensus of opinion that the iodine-sulphuric reaction is very frequently lacking, and that the aniline colors are more typical. In quoting Davidsohn and others he suggests that these reactions represent different stages in the development of amyloid, the reaction with aniline dyes appearing earliest and being present throughout, the iodine reaction appearing next, and that with iodine-sulphuric acid representing the last stage. Krakow, he states, lays the difference in staining not to a difference in chemical composition of the substance, but to a difference in the physical conformation of the older deposits.

According to Zeigler, we have as a result of this amyloid deposit or formation, on the one hand, a change in structure, and on the other hand a degeneration and disappearance of the cellular elements. The connective tissue is permanently changed, as the practically insoluble amyloid is never removed. The tissue is thickened, and when associated with blood vessels gives thickened walls, diminution in size and obliteration of the lumina together with a disturbance of the circulation and an atrophy of the neighboring parts. Many references are made to the frequent appearance of fat in or about amyloid deposits, occurring either independently or as a result of it. Koltz states that in regions of early amyloid deposits a deposit of fat can not be found, but as the deposit increases there is a saturation of the amyloid material with fat either diffusely or in work-like masses. Its (fat) origin has not been determined, but probably comes from the tissue fluids, or from liberation from degenerating cells in neighboring parts. However, the specific staining reactions are in no way interfered with, and the fat may be dissolved out by the ordinary solvents, showing that it is in a physical rather than a chemical combination.

Hutyra and Marek state that the degeneration occurs mostly in horses, and quote the following authors as to the occurrence of it in the domesticated animals. Bohl found it in 4 per cent of the horses autopsied. Joer, Pflug, Toerster, Panlicky and Hicback have

referred to its infrequent occurrence in animals. Rabe showed it in 50 per cent of all cases of chronic pleurisy and peritonitis. It has been observed in dogs by Rabe, Rivolta, Kitt and Dorflinger, and in the cat by Mathis. Burnett states that it does not occur as frequently in animals as in man.

Many causative factors are mentioned, among which are protracted and exhausting diseases, prolonged suppuration, long-continued irritation by bacterial toxins, pleurisy and peritonitis of long duration, carcinoma (Rabe), tuberculosis and chronic nephritis (Bruckmuller), and lymphangioitis (Reis). Burnett describes it as occurring mostly after some chronic suppuration but not after every suppuration. In man it is frequently the result of syphilis and chronic dysentery. To these might be added senility and unknown causes, especially in man. Experimentally, according to Hutyra and Marek, Krakow produced the degeneration in dogs, rabbits, chickens and pigeons by the repeated subcutaneous injection of cultures of *Staphylacoccus pyogenes aureus*, while culture extracts of the same bacterium failed to produce this result. It was produced by systematic injections of toxins of *Bacterium pyogenes*. Similar experimental results were obtained by Maximow in rabbits and chickens, by Davidsohn in rabbits, guinea pigs, mice and chickens, and by Ravenna in white rats. Lubarsch produced it in dogs in four weeks and in rabbits in three to four weeks by systematic injections of turpentine and by the suppuration so produced. Similarly Schlepilewsky succeeded more recently with enzymes.

Bailey, in more recent researches, succeeded in producing a general amyloidosis in 8 rabbits by injecting living cultures of *Bacillus coli communior* over 88 days. Eight showed lesions in the spleen, 6 in the kidneys and 3 in the liver. In practically every case suppuration was absent and therefore not a factor in the production of the condition. This overcomes the principal objection to producing amyloid by the injection of turpentine, toxins (bacterial) and ferments, in that it is almost impossible to make many injections without bacterial infection with subsequent suppuration. This objection is quite justified, however, as in much of the experimental work the condition is undoubtedly caused by the suppuration following infection at the time of these injections, more than by the substance injected.

Among the more important special stains or "microchemical reactions" might be mentioned the reactions with iodine-sulphuric acid, methyl violet, methyl green, polychrome methylene blue, and

Mallory's connective-tissue stain. In the iodine-sulphuric acid reaction the section is treated with Lugol's solution a few minutes, washed, placed in 1 per cent sulphuric acid, and then washed again. Amyloid should be blue, green or violet, other tissues being unchanged. In this reaction with iodine we must guard against other substances which become blue or violet with iodine, such as starch, certain bacteria, cellulose, and cholesterin crystals especially after standing a short time. Most investigators have had a great deal of difficulty with this reaction, claiming that it is uncertain or entirely lacking in some cases. Neuman, however, believes that unsatisfactory results here are due entirely to faulty technique on the part of modern investigators, stating that the methods advised in many recent text-books differ materially from that employed by the original discoverers. He further states that the iodine solution should be diluted, probably to the color of Rhine wine, and the tissues should remain in it just long enough to give them a slightly yellowish color; if stronger solutions are employed the tissue becomes overstained and the acid will produce a brown to black color. The specimen should then be mounted, a cover glass placed over it; and lastly a small drop of concentrated sulphuric acid permitted to run along the side. This, he says, will always produce a beautiful blue or violet stain of amyloid.

The methyl violet reaction is about the same, except that 1 per cent aqueous solution of methyl violet is used in place of Lugol's solution, and glacial acetic acid instead of sulphuric, followed by mounting in potassium acetate solution. Amyloid should be deep red, nuclei dark blue, and other tissues greenish blue.

Methyl green differs in no way from the one just mentioned other than in using a 1 per cent aqueous solution of methyl green. The polychrome methylene-blue reaction is somewhat more complicated and so will not be taken up here. Mallory's connective-tissue stain merely picks out the normal connective tissue fibers, leaving the diseased fibers poorly stained or not stained at all.

Besides the form of amyloid degeneration considered as a disease, usually affecting several organs, or, if only one organ is affected, we get diffuse changes of the whole organ, there is a localized form of amyloid deposit as localized infiltrations or free concretions. Local amyloid deposits are found in tissues affected with chronic inflammatory processes, chronic ulcerations, tumors undergoing retrograde changes, etc. It is usually found deposited in the ground substances, though one author (Rählmann) claims that the

cells of the tissue may acquire a hyaline appearance and give the amyloid reactions. We also find the substance in places not connected with inflammation. Corpora amylacea or free amyloid bodies are small lamellated irregularly shaped bodies found in parts of the central nervous system, lungs, mammary gland, prostate, etc. Ziegler states that the local deposits of amyloid and free amyloid concretions can not be regarded as being of the same nature as the progressive degeneration of connective tissue, as not all of them give the amyloid reaction. They are dependent upon local conditions for their origin, and consist in many cases of modified epithelial hyaline and connective tissue, as well as masses of degenerated cells.

A routine examination was made of certain organs of all animals examined at the postmortems held at the New York State Veterinary College, Cornell University, during a period of one year. The animals were principally cattle and horses, but other species were occasionally examined. In the observations but little attention was given to the macroscopic appearance of the affected organs or tissues, inasmuch as a positive diagnosis is impossible by that method, due to the quite similar appearance of closely related substances. Macroscopic changes appeared to be rather rare, however, in view of the fact that they were seen in but few cases, and then only over small areas.

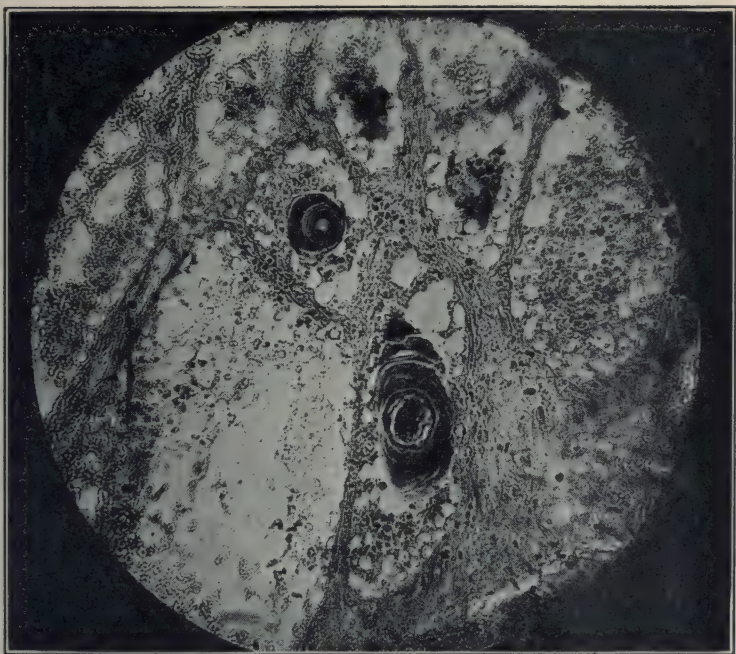
Most of the sections were examined in the fresh state by means of the freezing microtome, while others were fixed and imbedded in paraffin. Sections made in the latter manner brought out the changes more clearly, and a more careful examination could be made, but time was not available for this procedure. By the freezing method, however, one could, by careful technique, make fairly good sections within a few minutes, and with fairly satisfactory results. Some organs, such as the spleen, had a tendency to fall apart, and in such cases the paraffine method was used.

The iodine-sulphuric acid reaction was attempted at first, but with rather variable results, inasmuch as some tissues would fail to react to the iodine and still give a good coloration with the aniline stains. At other times the normal tissues would have a tendency to take the iodine coloration, which led to more or less confusion and indefinite results. Neuman's technique for this reaction was not learned till most of the observations were made, so this method was not tried except in a few cases. In these few cases results were much more gratifying than by the ordinary methods. The test most

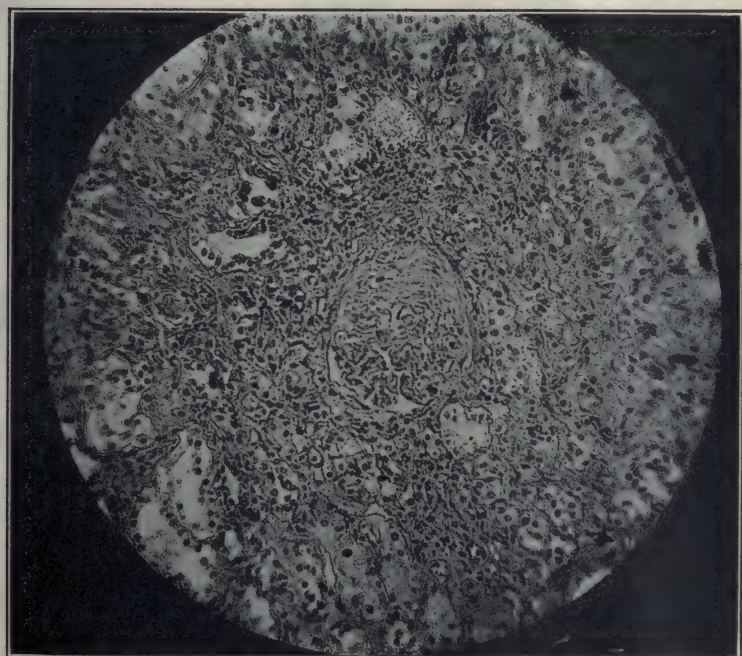
extensively used and which gave the most satisfactory results was that in which the sections were stained with a 1 per cent solution of methyl violet in 3 per cent glacial acetic acid, followed by washing with distilled water and mounting in glycerin. Results by this method were very satisfactory.

Colloid and elastoid degenerations were seen in but few cases, leaving the differentiation mainly between hyaline and amyloid. Even here results were somewhat variable, but this was to be expected in view of the close relation between the two substances in physical appearance and chemical composition. Both were frequently seen in about the same places, and in many cases the stains failed to give a distinct differentiation. The older amyloid deposits gave a very bright violet red coloration, but in the younger and smaller deposits numerous gradations in the intensity of staining were observed, varying from the intense violet red down to the faint pink color bordering on the negative reaction characteristic of substances of a true hyaline nature. All of these stages, the fully developed amyloid, young deposits and hyaline, were seen in a few cases in the same organ. This lack of a sharp distinction in staining reactions, together with the fact that lately amyloid substances have been found which did not contain the characteristic chondroitin-sulphuric acid, tend to strengthen the belief that the two substances are very closely related, amyloid being but a later stage of hyaline.

This gradation in the intensity of staining was observed quite clearly in the case of corpora amylacea found in the mammary gland of a cow. It is unfortunate in this case that no history of the animal could be obtained nor an examination be made of the other organs for a general condition of amyloidosis. In sections there was a marked degeneration of the parenchyma and interstitial tissue with amyloid degeneration of the smaller blood vessels as thick homogeneous bands of infiltration beneath the endothelium. In the acini were numerous small irregularly shaped lamellated corpora amylacea, which stained rather unevenly. In the center the coloration was quite dark, but toward the periphery the layers became progressively lighter in color, the outer one being a faint pinkish color. Here it would seem that the body consisted of a single substance made up of layers, the more central or older deposits taking the stain more deeply than the peripheral or newer deposits. Herz found these bodies quite frequently in the examination of milk and dairy products for starch derivatives. Both gave



Corpora Amylacea, Mammary Gland



Amyloid Degeneration, Kidney

the bluish color with iodine, but the amyloid bodies did not give such a diffuse coloration, for they did not clump together as did the starch granules.

A particularly interesting case was noted in an old St. Bernard dog with a history of edema of the chest and legs together with general symptoms of dullness, depression and anorexia. The heart was very fast and pounding, pulse fast and almost imperceptible, blood pressure very high. The most striking lesion was in the tricuspid valve of the heart, which was much thickened and presented a peculiar gelatinous appearance. On microscopical examination the connective tissue was much increased in amount, calcification was present in areas, and in one place the tissue was taking on an osteoid appearance. Numerous areas of homogeneous material giving the test for amyloid were noted infiltrating the much-increased connective tissue. Associated with this was a certain amount of fatty degeneration. Several of the smaller blood vessels showed band-like infiltrations of amyloid. Examinations of liver, kidneys, spleen and aorta failed to give evidence of a general condition of amyloidosis.

In the sections of livers examined the condition appeared in scattered areas, affecting both the interlobular connective tissue as well as that associated with the blood vessels. When present in the interlobular connective tissue it appeared as spindle-shaped infiltrations between the connective tissue fibers and was limited mostly to those lobules the blood vessels of which were also affected. A few of the interlobular vessels showed infiltrations under the endothelium, either as complete bands, or separated areas of crescent shape, or lumpy masses of the homogeneous, shining substance. The capillaries within the lobules were sometimes affected merely by a slight thickening under the endothelium, while in other cases the vessels were so thickened as almost to cause obliteration of the lumina. Here too the material was laid down either in thick bands or broken masses. As a result the liver cells were in some cases but slightly compressed, while in others there was partial or complete atrophy, leaving the lobule made up of worklike masses of the substance with occasional remains of the atrophic parenchymatous cells. The afferent blood vessels were affected in some cases, but the tendency always seemed for the condition to start at the periphery of the lobule and work toward the center.

In the kidney the capillaries of the glomeruli were most often affected. Here it was manifested in the same manner, by the thick-

ened homogeneous infiltrations beneath the endothelium, with the resulting partial or complete obliteration of the lumina. But few vessels may be affected, or the glomerulus may appear to be composed entirely of worklike masses. Other vessels in the organ often are affected and associated with this; one frequently finds hyaline casts in the tubules.

In the spleen the condition was confined to the smaller vessels of the Malpighian corpuscles and in a few cases to the connective tissue of the trabeculæ. One very interesting section from a cat was seen, in which the trabeculæ were very much thickened by a quite diffuse infiltration with marked degeneration and atrophy of the connective tissue.

In the lymph glands the condition was limited to the smaller vessels of the lymph nodes. Some of the smaller vessels were affected in one of the sections of intestine examined.

In another instance the wall of a bladder was very markedly thickened, showing on macroscopical examination a peculiar gelatinous appearance. On section it proved to be a very good example of amyloid affecting connective tissue other than that associated with blood vessels. There was a marked degeneration of the tissue cells, and thick spindle-shaped infiltrations of amyloid in between the compressed and atrophic connective tissue were found.

In general:

1. The condition appeared on microscopical examination to be about the same in animals as in man, though rarely appearing so diffuse as to be seen by macroscopic examination. This may be due to the fact that animals suffering from any chronic disease are either cured or destroyed within a short time, and that comparatively few animals live to old age.

2. In several cases the condition was observed affecting connective tissue other than that associated with blood vessels.

3. Sufficient material was not available to make a statement as to the relative frequency of occurrence, but it would seem that the condition is fairly common though affecting only small areas in the various organs.

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Professor Bimes, of the Veterinary School of Toulouse, France, has received the title of Chevalier of the Legion of Honor in recognition of his thirty years of distinguished service.

Dr. F. H. Barr, of Albuquerque, N. M., has been appointed Resident Secretary, to succeed Dr. M. W. Miller.

Dr. E. T. Harrington, 873 Broadway, Boston, Mass., has been appointed Resident Secretary of that State, to succeed the late Dr. Winchester.

Dr. J. B. Bushong has resigned his position with the Cutter Laboratory and has become City Veterinarian and Chief Milk Inspector for the city of Los Angeles.

Dr. Seymour Hadwen has resigned his position as chief pathologist in charge of the Biological Laboratory, Health of Animals branch, Canadian Department of Agriculture, Ottawa, Canada, and has taken a position as chief pathologist in the Reindeer Investigations of the Bureau of Biological Survey, U. S. Department of Agriculture. His headquarters and post-office address after July 1, 1920, will be Unalakleet, Alaska.

Dr. Ivan Isaacson, for several years engaged in serum production work at the Lederle Antitoxin Laboratories, has resigned and is at present associated with Dr. M. G. Wohl at the Laboratory of Clinical Pathology, Omaha, Nebr.

IMPORTANCE OF PREPAREDNESS IN MEETING FUTURE OUTBREAKS OF FOOT-AND- MOUTH DISEASE¹

By JOHN R. MOHLER, *Washington, D. C.*

SUDDENLY and unexpectedly three outbreaks of foot-and-mouth disease have appeared in this country within my experience. The sources of the infection in the first two were definitely determined, but the origin of the 1914 outbreak remains a mystery. The 1902 and 1908 outbreaks were confined within narrow limits in Eastern States where the animal population was comparatively sparse and other conditions also were favorable for successfully combating a contagious disease. Each of these outbreaks was eradicated within five months at an approximate cost of \$300,000.

The 1914 outbreak was the most extensive of any that has yet visited this country. In this instance the infection gained access to the Chicago stock yards, our largest live-stock market, and within thirty days it was transported to the Atlantic and Pacific coasts. An alarming feature was the appearance of the disease on ranches in the open-range country of Montana. In all, twenty-two States and the District of Columbia were invaded in rapid succession, and the prospects of successfully combating this outbreak were discouraging. Although it cost the National Government and the States approximately \$9,000,000 to exterminate the outbreak of 1914-15, we were fortunate in being able to prevent the disease from gaining a permanent foothold in this country.

It is notable that these previous outbreaks have occurred at the same season of the year, with an interval of about six years between them; so if history repeats itself we are due for another outbreak in the fall of 1920. However, the occurrence of previous outbreaks at regular intervals is regarded as merely a coincidence, and we may expect another at any time. The history of this dreaded animal plague in foreign countries is built of recurrences. With the disease present in most of the countries with which we cultivate commercial relations, and with the resumption and extension of our foreign trade following the war, our danger of another visitation is increasing. England has had forty-nine herds to develop the disease in the last forty-three weeks, due chiefly, it is said, to the return

¹ Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

of soldiers from infected France. In Southern France and Italy the infection has been reported in epizootic form, and the same is true in certain South American countries. Although every reasonable precaution is being employed to prevent another invasion, it is realized that it is practically impossible to preclude all possibility of danger and at the same time preserve our foreign commercial relations; therefore it becomes necessary for us to be on the alert promptly to detect the first appearance of the disease and to make preparations to eradicate outbreaks as soon as possible when they occur.

PREPARATIONS BY THE BUREAU OF ANIMAL INDUSTRY

Veterinarians representing the Bureau of Animal Industry have been stationed in Great Britain continuously since July, 1890, to guard our interests in connection with the live-stock traffic carried on between this country and Europe.

To guard more effectually against the introduction of harmful animal diseases from abroad, including foot-and-mouth disease, the regulations covering the importation of animal products were revised, effective January 1, 1917.

After the discovery that foot-and-mouth disease was introduced in this country in 1908 through the importation of contaminated smallpox vaccine, a law was passed by the Congress and approved March 4, 1913, governing the importation of viruses, serums, toxins and analogous products intended for use in the treatment of animals.

Immediately after the outbreak of 1914-15 the Bureau directed its attention to imported animal products from South America as a possible source of infection. In order to obtain the facts, one of the most competent veterinary inspectors in the Bureau was detailed indefinitely to South America to investigate and report to the Chief of the Bureau on the extent and spread of animal diseases in that continent, the methods of control and eradication employed, the efficiency of the antemortem and postmortem inspection of animals the products of which are intended for export to the United States, and to keep the Bureau informed concerning all matters of interest in order that further action might be taken if necessary to protect our country as far as possible against the invasion of foot-and-mouth disease from that source. At present there are two representatives of the Department of Agriculture in South America studying live-stock matters.

In November, 1916, the Veterinary Director General of Canada

reported that he was in receipt of information from official sources in England that agents of the German Government were making attempts in Switzerland to enlist the services of Swiss farmer emigrants to spread foot-and-mouth disease in Canada, and that they would probably enter Canada through the United States. On receipt of this information arrangements were promptly made with the United States Secret Service, the State Department, the Treasury Department, the Bureau of Immigration and the United States Public Health Service for a careful examination of baggage and clothing and a rigid interrogation of all emigrants from suspicious sources. In addition a record of each immigrant, as recorded in the manifest, was forwarded to the Bureau of Animal Industry at Washington, and many of these immigrants were traced to their destination and their movements watched.

In November, 1915, a book, "Instructions for Employes Engaged in eradicating Foot-and Mouth Disease," was issued and distributed to Bureau and State officials throughout the country. A supply of copies is held in reserve ready for immediate use in case of further need.

In January, 1917, the Committee on Live-Stock Sanitary Affairs of the Bureau was called together to review the history of the 1914-15 outbreak and to confer with the various States in formulating a definite plan of action to be pursued in case of future outbreaks. On January 16, 1917, a letter was addressed to the proper officials of each State informing them that the Department desired to formulate some definite plan of action to be followed promptly and effectively in coöperation with the various States in the event of another outbreak, and requesting information as to their powers and resources to coöperate with the Bureau.

This letter was followed by another in May, submitting for the consideration of the State authorities a tentative plan of action and requesting a statement in reply as to whether or not they were prepared to coöperate promptly with the Bureau in carrying it into effect if approved. The main features of this plan are the application of quarantine, slaughter of affected herds, subsequent cleaning and disinfection of infected premises, and sharing of expenses equally between the State and National Governments.

It was suggested that in order effectively to carry out the proposed plan the State laws should provide for—

1. A live-stock sanitary board or other executive head with a wide range of power to promulgate regulations without delay to meet

conditions as they arise and act independently on matters of detail. The regulations should be in conformity with Federal regulations.

2. An adequate emergency fund immediately available, or authority for the Governor to issue interest-bearing certificates of indebtedness, for meeting promptly all expenses incurred in connection with eradication work, including the payment for animals and other property destroyed.

3. Coöperation with the United States Department of Agriculture in controlling and eradicating contagious diseases of animals, especially foot-and-mouth disease.

4. A State veterinary organization consisting of not less than one representative in each county of the State.

5. Veterinary practitioners to report immediately to the proper authorities all cases of foot-and-mouth disease that come to their attention.

6. The sterilization of public creamery by-products before they are returned to the farm.

7. Authority lodged with the live-stock sanitary board or other executive head to establish quarantine of infected herds, exposed herds and as much territory within the State as is deemed advisable.

8. Authority for entry and destruction of animals and property.

9. The appointment of an appraiser or appraisers.

10. The fixing of a just maximum valuation for grade and pure-bred registered animals in affected herds.

11. Penalties for violation of the law and regulations.

The proposed plan was unanimously approved by the State officers, but the replies showed that ten of the forty-eight States had no authority under their laws to coöperate with the National Government in the eradication of foot-and-mouth disease. Only six States had adequate funds available to begin effective eradication work should an outbreak have occurred at that time. Two States had less than \$5,000, and seventeen had amounts ranging from \$5,000 to \$50,000. The largest sum that any State specified as available was \$250,000, but two reported that they had as much available as was necessary. Sixteen of the States had no laws or regulations authorizing the condemnation and appraisal of animals and materials destroyed or for the payment of such expenses. In two States the laws gave authority to pay only for animals slaughtered on account of the disease and not for materials destroyed in connection with the cleaning and disinfection of infected premises.

It was evident from the replies that 80 per cent of the States

were in need of additional laws and 87 per cent had insufficient funds or no funds to begin effective foot-and-mouth disease eradication work. Under such conditions many of the States, and likewise the Bureau, would be seriously handicapped in carrying out any effective coöperative plan of action in eradicating foot-and-mouth disease.

Ever since the outbreak of 1902 the Department has endeavored to impress upon the various States the importance of preparation to meet promptly and effectually outbreaks of foot-and-mouth disease. This matter was particularly emphasized at the meetings of the United States Live Stock Sanitary Association in 1914, 1915, 1916 and 1917, and in correspondence since that time. The States and the Department of Agriculture have had five years since the beginning of the last outbreak in which to prepare for the next.

So far as the Bureau of Animal Industry is concerned, it is believed that it has never been so well organized and equipped to combat promptly and effectively an outbreak of foot-and-mouth disease. The Bureau has in its employ 4,673 persons of whom about 1,550 are veterinarians. A survey of the field force shows that at this time there are 1,408 veterinary inspectors of the Bureau engaged in different lines of field work in the forty-eight States. These veterinary inspectors are distributed as follows:

Hog Cholera Control:

140 veterinary inspectors working in 34 States.

Tuberculosis Eradication:

158 veterinary inspectors working in 43 States.

Tick Eradication:

154 veterinary inspectors working in 10 States.

Field Inspection (scabies, anthrax, dourine, stockyards inspection):

117 veterinary inspectors working in 36 States.

Virus-Serum Control:

57 veterinary inspectors working in 12 States.

Quarantine Inspection:

32 veterinary inspectors working in 9 States.

Meat Inspection:

750 veterinary inspectors working in 46 States (128 cities).

1,408 Total.

In addition to the veterinarians, there are lay inspectors in the meat and field inspection service and experienced employes of the

Dairy and Animal Husbandry Divisions of the Bureau stationed at various points in different States, and in emergency much valuable assistance could be rendered by employes of the extension divisions of agricultural colleges. At the present time 160 representatives of the Animal Husbandry Division are stationed in 48 States and 120 representatives of the Dairy Division are conducting operations in 40 States.

The Bureau has not only instructed its employes in regard to the methods of procedure, but in addition it has selected certain experienced individuals to fill assignments in the various lines of eradication work in the event of another outbreak. The names of these men with their assignments are on file in the Bureau office at Washington, so that within an hour after a positive diagnosis of foot-and-mouth disease, instructions could be telegraphed and each man would know his place and duties in the field organization. The States have been urged to make similar preparations so as to avoid delay when the time arrives to begin operations.

Any policy adopted for the extermination of a contagious disease should have the support of the live-stock and allied industries. It has been the policy of the Department to combat outbreaks of foot-and-mouth disease through the application of quarantine, the slaughter of affected and exposed animals and the cleaning and disinfection of infected premises, because this is believed to be the quickest, safest and most economical method. These drastic measures have proved successful in this and other countries, while less drastic methods have been unsuccessful in eliminating the disease from other infected countries.

In order to obtain the views of persons interested in live-stock matters relative to the policy to be pursued in the future, the following letter was addressed recently to live-stock and dairy organizations, live-stock sanitary authorities, live-stock, dairy and farm papers, live-stock exchanges, professors of animal husbandry connected with State agricultural colleges, and many prominent live-stock men.

"September 22, 1919.

"Dear Sir:

"I am writing to you with the hope of obtaining a frank expression of your views relative to the policy that should be pursued in the event of a future outbreak of foot-and-mouth disease in this country.

"It is well known that the Bureau has always looked with favor upon the prompt slaughter of all affected and exposed animals in connection with the application of appropriate quarantine and

disinfection measures. In combating past outbreaks it has pursued this policy because it believes that method to be the quickest, safest, most economical way, and serves best the interests of the greatest number engaged in live-stock pursuits and allied industries. Our preference for that policy is based upon our knowledge of the nature of the disease and the experiences of different countries in handling outbreaks. In this country the slaughter method has always proved successful and it has received the hearty support of the coöperating State authorities and the live-stock industry in general.

"After the conclusion of the work of stamping out the last outbreak, a committee was appointed in the Bureau to review the entire experiences of that outbreak and prepare plans for meeting future invasions of the disease. The proposed plans were submitted by the Secretary of Agriculture to the live-stock regulatory authorities in every State for approval, with the recommendation that prompt action be taken to prepare to carry them into effect in case of emergency, and suggestions were made as to what such an emergency would require on the part of each State. Congress, at the request of the Secretary, appropriated the sum of \$1,000,000 as an emergency fund, to be available should the disease again appear in this country. The Bureau is organized to combat another outbreak; it is carefully investigating every case coming to its attention which shows suspicious symptoms, to make sure that the disease does not get a foothold before it is discovered, and every possible means are being employed to prevent an invasion from abroad.

"At the time of the last outbreak live-stock men were generally of the opinion that this disease must be stamped out, and that regardless of sacrifices and costs it must not be given a possible chance to become permanently established in the United States. It was universally conceded that all affected common and grade animals should be slaughtered promptly, but some have suggested the advisability in the future of attempting to save some purebred animals, and cited the National Dairy Show herd as an example of the possibilities in this line of conservation.

"Of course the Bureau could consider saving such animals only where the conditions for isolation are ideal as they were in the case of the National Dairy Show herd. Then in such instances it would be necessary to impose equally rigid requirements, including the maintenance of guards, the proper disposition of products, prolonged quarantine, slaughter of chronic cases, and finally transfer of the animals after disinfection to other clean quarters for final tests with contact animals before release. We could not afford to relax any from the precautions exercised with the National Dairy Show animals, and it would be absolutely necessary to adopt practically the same procedure in similar instances.

"To undertake to save animals of unusual value must necessarily increase the difficulty of eradicating the disease. The Bureau has no arbitrary policy in the matter and its only wish is to serve the

live-stock industry most effectively. If such service is performed by the adoption of the surest methods of eradication in the shortest possible time, then in the light of our present information the course that must be followed is to slaughter all affected and exposed animals as promptly as possible. If on the contrary it is the judgment of the majority of the State authorities and live-stock owners that the best service can be rendered in attempting to save some of the most valuable animals even if the time and expense of eradication are increased, the Bureau is willing to consider it; but in the circumstances it would hesitate to deviate from its tried methods without first having an expression from those who are also keenly interested in this important matter.

"Experience has shown that a rigid quarantine prolonged a sufficient time is more expensive than when the animals are slaughtered. No doubt the principal reason for the failure of the 'quarantine and treatment' method is the difficulty of maintaining an effective quarantine. With the aid of the military forces European countries were unable to effect such a quarantine. Would it be possible, therefore, to maintain on farms in this country for months a quarantine that would be sure to prevent the movement from quarantined premises of anything that might carry the infection? This Bureau believes not. A long quarantine is sure to be less effective than a short one.

"The only animals that might be considered of sufficient value to undertake to save are those that are contributing something to their breeds that would be lost should they be destroyed. Any pure-bred animal of decided merit is useful to its breed in that it aids in increasing the number of good animals, but unless it is contributing something unusual this loss is not irreparable to the breed as a whole. There are animals, however, which if destroyed would result in the loss of something that would require years to restore. In view of the risks involved, should an effort be made to save even such animals? If so, when and how shall the line be drawn? Who shall receive the benefits, if there are any, of such an advantage? Should the live-stock industry as a whole be penalized by prolonged State and foreign quarantines in order to protect the interests of a few individuals? Would it pay in the end?

"It is impossible to determine the cost of this disease to the countries where it has become permanently planted. We know, however, that the continued presence of the infection imposes a tremendous burden upon live-stock production and agriculture in general. It cost the National Government approximately \$300,000 each to eradicate the 1902 and 1908 outbreaks, and to eradicate the outbreak of 1914-15 it cost approximately \$4,600,000. The States' share was 30 per cent in the 1902 outbreak, 33 1-3 per cent in the 1908 outbreak, and 50 per cent in the last outbreak. The total cost to the National Government and the States to eradicate the three outbreaks is a small sum compared to the direct and indirect losses that no doubt would have resulted through damages to stock, inter-

ruption of commerce, exclusion from domestic markets and destruction of foreign trade through the operation of State and foreign quarantine, had our efforts to eradicate the disease proved unsuccessful.

"Our country is free from the plague and our interstate and foreign commerce is unhampered by any quarantines on account of foot-and-mouth disease. We have succeeded in every instance where we have attempted to eradicate an outbreak by the methods we have employed, while the foreign nations have failed when they have resorted to the less drastic policy of 'quarantine and treatment.' The live-stock industry is confronted by the question, 'In the future shall we deviate from our former successful methods by attempting to save any purebred animals?'"

"Your careful consideration of this matter and your frank suggestions on this and all matters relating to the future policy for handling an outbreak of the disease in this country, are earnestly desired.

Very truly yours,

"J. R. MOHLER, *Chief of Bureau.*"

Since September 22 the Bureau has sent out 368 of these letters. By far the largest number of the replies received to date favor the policy that has been pursued so successfully in combating outbreaks of the disease in this country. Next in order, but decidedly less in number, come those who believe that an attempt should be made to save by stringent isolation and quarantine only purebred sires of exceptional and unusual merit. Some would carry out the policy that has been pursued in the past except in such unusual cases where large numbers of valuable animals are assembled as in the case of the National Dairy Show herd, and a few others are of opinion that efforts should be made to save both male and female registered animals of exceptional breeding value on farms.

It is hoped that this letter, besides bringing out expressions of the views of representative men, will strengthen sentiment in favor of a vigorous and effective method of eradication in case of future outbreaks.

Rural World and Western Empire (June 12) says of the better-sires campaign's total of 990 owners of 63,628 farm animals: "This is a very good showing, but it must be realized that the campaign has been of tremendous educational significance, and its value is not to be measured by these figures alone. In fact, we would say that the value of this campaign has been really immeasurable to the agricultural interests and to the country at large." Also to veterinarians.—Ed.

THE ANIMAL ENGINEER¹

By WILLIAM HEBRERT LOWE, *Paterson, N. J.*

DID you ever stop to think how limited some people's vision is respecting the more important things of life? There are those who do not believe in God or in man further than their own individual interests are concerned. There are those who believe that the displacement of the horse by the automobile and auto truck means the end of a noble profession; so it may be well for us at this time briefly to consider some of the problems of the profession, for I feel we should use our best endeavors to enlighten the public as to the character and scope of the work of the veterinarian.

Economic considerations will always insure the employment of the skilful practitioner in the treatment of the accidents and ailments of domestic animals, and humane sentiment will prompt the calling of the veterinary practitioner for the alleviation of the suffering of our animal pets. The repair of the animal machine so that it can function again and perform the work required of it is in itself of inestimable value in relieving suffering and in the saving and the restoration of valuable property.

I desire today, however, to speak more particularly of some of the problems of preventive medicine in the protection of our flocks and herds from infection and infestation and also of the desirability of the development of a better animal husbandry than the world has yet seen, that will provide clothing and human food more abundantly and more economically without imperiling public health.

In a number of striking instances this country has had the benefit of an intelligent application of the principles of veterinary science demonstrated in the control and eradication of infectious and contagious diseases over wide areas that would have practically ruined the live-stock industry if our science had failed when put to the crucial test, but it did not fail and it will never fail so long as men of ability having the natural aptitude are thoroughly educated in the fundamental sciences of the veterinary profession.

Although great has been the achievements of veterinary sanitary control and eradication work during the past quarter of a century, yet it is safe to predict that still greater demands will be made upon the profession in the future. The production and conservation of

¹ Paper read before the Veterinary College Alumni Association of New York University at Carnegie Laboratory, New York, N. Y., March 8, 1920.

beef, mutton, pork, poultry and animal-food products and by-products, as well as hides, leather and wool for clothing, involve for solution many scientific and practical problems that require the expert knowledge of the highly trained veterinarian, who must be nothing less than an animal engineer in a very real and vital sense if an annual loss of \$200,000,000 from animal diseases alone is to be saved and a ten-billion-dollar industry conserved, extended and developed to its highest state of efficiency.

The immense value of animal experimentation and investigation is brought to our minds in the exhaustive study of parasitic diseases made by our fellow alumnus, Cooper Curtice. You will be glad to know that to my personal knowledge Curtice is just as close a student today on Uncle Sam's sheep farm in Virginia as he was in New York City back in 1883. The value of his tireless labors to science, to the live-stock industry, to producer and to consumer; is beyond calculation. He has made the world his debtor.

The nation-wide movement recently inaugurated by our Government for the eradication of animal tuberculosis and the establishment of tuberculosis-free herds of cattle progresses satisfactorily under the masterful direction of a veterinarian who is a magnificent example of an animal engineer. I refer to our esteemed fellow alumnus, John A. Kiernan.

I am anxious to see the day come when the best talent of the veterinary profession will be engaged in helping the breeders of this broad land in the production and development of an animal husbandry superior to anything the world has yet seen, instead of its members being compelled to devote their best energies to the control and eradication of diseases most of which would not occur at all under a more intelligent and efficient management of the animal industry.

The replacement of scrub sires among all classes and breeds of domestic animals with purebred or high-grade stock, and also the determination to improve the quality of purebreds themselves, as a nation-wide movement on the part of the United States Department of Agriculture, deserves our highest commendation and the most earnest support of everybody interested in the improvement of live stock.

Do not let us lose sight of the fact that one of our own highly esteemed alumni, G. Howard Davison, of this city, who, by the way, is on the program to speak this afternoon on the sheep industry, is one of a group of a few men who have taken a most conspicuous

part in the development of a better animal husbandry in America. You will recall that Alumnus Davison was one of the founders of the great International Live-Stock Exposition at Chicago and that he has served that organization in the capacity of president. In the publication of *The Field*, beautifully illustrated, he is doing much to promote high ideals in animal husbandry, which is another splendid exemplification of the activities of the veterinarian who is an animal engineer in another field of the profession—*The Field Illustrated*.

I would like to recommend to the University authorities the advisability of bestowing the degree of B.S. or M.S. in animal engineering upon veterinarians who especially distinguish themselves in the study and practical application of scientific principles to the problems of animal husbandry and animal industry.

The veterinarian is a student of life, plant and animal, and in this field his possibilities are simply illimitable. The outlook is most encouraging for those who are fitted and qualified. Let me emphasize that if his investigations and experiments are to be of the greatest value to humanity his work must be constructive in character, and I might mention that the field of his activities are attractive to the true scientist laboring for the solution of fundamental problems.

The development of scientific agriculture and the technical education of agricultural students in animal husbandry at agricultural colleges and experiment stations probably has done more to demonstrate the necessity for men specially fitted and trained in veterinary science than any other one factor. The more agriculture progresses the more its votaries appreciate the importance of a knowledge of comparative medicine in connection with the problems of animal husbandry and the greater is their appreciation of the scientifically trained veterinarian. Animal experimentation and research work has suffered at some of our agricultural colleges and experiment stations because it was impossible to obtain qualified veterinarians fitted by training to take up this specialized line of work of pre-eminent importance to agriculture. There is also a pressing demand for veterinarians as instructors of agricultural students in veterinary subjects, particularly for students who are specializing in animal husbandry. The mutual reciprocating relations existing between the soil, plants and animals require for the most comprehensive instruction of students that they should be studied from the viewpoint of the veterinarian as well as from that of the agri-

culturist. The various needs of the animal body must be considered, whether for maintenance or for the production of specific commercial products.

The activities of the county agricultural agents if properly exercised tend to extend the practice of the veterinarian. There should be the most cordial coöperation between the county agent and the practicing veterinarian in everything for the benefit of the community.

The artificial conditions under which domestic animals are bred and maintained account for not a few of the diseases that occasion considerable loss to the breeder of purebred stock. Sterility not infrequently will be found to be a condition induced by injudicious breeding and bad management, sometimes resulting in the necessary sacrifice of valuable animals. The veterinarian with a practical knowledge of animal husbandry is sometimes able to overcome this difficulty where others would fail.

The fact that the breeders of dairy cattle in a certain county in Illinois have engaged a qualified veterinarian to have supervision over their stock with the view of preventing disease instead of curing it is a splendid movement and shows the trend of the times. The veterinarian is paid an adequate salary by the breeders, as they realize that prevention is of paramount importance and to the extent that scientists have determined the causes of the various diseases of live stock the war against them can be intelligently conducted. The causes of diseases and the sources of pestering parasites are matters of deep concern to the stockman, and the best methods of warding off diseases and making them innocuous are all-important.

One of the problems that this veterinarian may possibly undertake would be that of improvement in the inherent strength of the constitution and disease-resistant power of the live stock of his community through the mating of more vigorous animals, giving especial attention toward the preventing of infection of the animal at the time of birth. Precaution would also be probably taken against the checking of rapid growth and development while the animal is being maintained in a favorable environment to the exclusion of every detrimental influence.

In every community a large amount of animal waste could be profitably utilized by the establishment of a community conservation plant where carcasses of dead animals would be converted into fertilizer and into commercial products under safe and sanitary

conditions. I mention this in passing as an instance where the veterinarian who is an animal engineer can coöperate with local authorities in an important matter.

A veterinarian who is an animal engineer could readily fill such a position as manager of a stock farm, and there are also opportunities for the right man in every community in sanitary work, meat inspection and dairy inspection.

There is an opportunity for the veterinarian who is an animal engineer to occupy an important place in railroad administration just as soon as he is able to show his worth. He would have charge of handling live-stock transportation problems, sanitary problems, supervision of stockyards, feeding and loading stations, cars, etc. Such a veterinarian would inspect all the territory through which the railroad runs to determine the facilities and conditions for handling live stock and for the purpose of determining the adaptability of the land in various parts of the country for the growing of horses, cattle, sheep and swine. He would also investigate claims made for depreciation of live stock in transit or loss by accident or disease.

A notable falling off in the attendance of the veterinary colleges is reported. There were almost as many students in one of the western schools before the war as there are now in all the veterinary colleges of America. The profession needs more men if progress is to be made in the work and problems that confront it, but they must be men of ability and natural aptitude and possessing a broad education and a high purpose; for, as I have intimated, the day is near at hand when the best talent of the veterinary profession will be more intimately engaged in coöperation with agriculturists in the upbuilding and development of a better and a larger animal husbandry and a greater animal industry. A trained veterinarian who is an expert animal engineer will be in demand for this great constructive enterprise of gigantic proportions involving vast economic and public-health problems. I trust I have at least pointed out the way. Let us prepare.

With the approach of the A. V. M. A. annual meeting at Columbus it seems appropriate to recall the story of the Englishman who appealed to an American to set him right as to the pronunciation of the name of one of the United States. "It is most confusing," he said. "Some of your countrymen call it 'O-hi-o,' while others pronounce it 'I-o-wa.' Now please tell me which is correct."

RABIES AND ITS PREVENTIVE TREATMENT¹

By JOHN F. MCKENNA, *Fresno, Calif.*

CAUSE OF RABIES

THE cause of rabies is a parasitic protozoan discovered by Negri and generally known as the "Negri body." His work has been corroborated by investigators in all parts of the scientific world.

NATURE OF RABIES

Rabies is transmitted to human beings through bites of rabid animals, most frequently dogs, but also cats, horses, cattle, sheep, goats, hogs, and animals of prey such as wolves, foxes and martens. The saliva of the animal is the medium which carries the virus. The disease may be transmitted by the deposit of saliva, containing the virus, on abraded surfaces, as by licking. In all cases a wound or an abraded surface of the skin is necessary for the absorption of the virus; it can not pass through the sound skin.

PREVALENCE OF RABIES

Rabies occurs in almost every part of the world, Australia being the only country known to be exempt, owing to the rigidly enforced quarantine. In France, Belgium, Hungary and Russia the disease is widespread. England, because of quarantine and periodic muzzling of dogs, was free from the disease for over a decade; but during the World War dogs were brought into the country by airplanes and the disease appeared again.

Rabies occurs in practically every part of the United States. In 1911 Stimson stated that it had been reported in all but six States and that there were 1,381 infected localities. The disease was unusually prevalent in the United States in 1919.

RABIES IN FRESNO COUNTY

During the past several months it has been apparent that rabies is more prevalent in this county than at any time during the past eight years. In two school districts near Sanger it was necessary to establish a quarantine, consisting of the following requirements:

1. All stray or homeless dogs were ordered destroyed.
2. Any dog found on a public highway was destroyed.
3. Owners were required to keep their dogs chained up on their

¹ Presented at a meeting of the Fresno County Medical Association, March 12, 1920.

premises, and were advised to kill any stray dog which came upon their ranches.

With these restrictions we were able in sixty days to eliminate rabies from the above-mentioned districts.

However, during the past ninety days we have found cases of rabies in animals in nearly every other part of the county, and the number of persons which have been bitten by these animals has been particularly noticeable.

The State Board of Health has sent an officer to this section of the State to make a careful study of the condition. He has looked over our records and from this investigation he has placed before the Board of Supervisors certain suggestions for the elimination of this condition and has asked for their adoption.

The writer in his official capacity as county live-stock inspector has on numerous occasions been called on to give advice as to the proper method of handling an animal which has shown signs of this disease, and also by people who have been bitten by animals which had the disease or were suspected of being rapid. On many occasions physicians have asked for advice in reference to whether or not a person bitten by a dog should be subjected to the Pasteur treatment before a positive diagnosis of rabies had been made. This paper has been prepared primarily for the reason that a difference of opinion seems to exist regarding this all-important treatment.

FIRST AID TO PERSONS BITTEN

In case a person is bitten by an animal it is highly advisable that the wound be cauterized at once, preferably by a physician. If it is not possible to have a physician in attendance immediately, the wound can be properly cleansed with warm water and partially cauterized by the patient, to be again cauterized as soon as possible thereafter by the attending physician. Of the cauterizing agents, fuming nitric acid is perhaps the best. Excessive tissue destruction may be diminished by washing afterwards with physiological saline solution. Pure carbolic acid followed by alcohol may be used, although it is not so efficacious as nitric acid. Even better treatment is the application of pure formalin or a 5-per-cent formalin solution applied over a period of 12 hours. In the absence of surgical attendance, cauterization should not be delayed. On the other hand, if, for any reason, it has been delayed even as long as three days, it should not be omitted.

CONTROL OF ANIMALS

Referring now to the animal, it should be placed under the observation of a competent veterinarian, and should not be destroyed immediately unless a positive clinical diagnosis is made that the animal has rabies.

The advantages of holding the animal under observation are, first, in the case of a dog, it may be that the animal was startled and had bitten a person from fright, or it may have been an animal which is mean, or, as it has been our experience, an animal which is ordinarily friendly, at the time of whelping becomes cranky, and will bite at strangers, or at anyone who annoys it. By placing such animals under observation it has many times been the case that they show absolutely no symptoms of rabies, and therefore it was unnecessary for the persons bitten to undergo the Pasteur treatment.

On the other hand, assuming that the history was that the dog was slobbering at the mouth and showing various symptoms before biting, and after having bitten the person it was immediately killed, it is then impossible to arrive at a positive clinical diagnosis, and it is usually useless to send the brain of such an animal to the laboratories for examination, as many times the disease has not developed sufficiently for the laboratories to be able to find the Negri bodies, and, as often is the case where the animal is destroyed by a shotgun, the brain is injured to such an extent that the laboratory examination is useless.

However, by confining the dog and holding it under observation, very often from 12 to 48 hours, it is possible to make a positive clinical diagnosis, and then the head can be properly prepared and sent to the laboratory for a laboratory examination.

INCUBATION

As the average period of incubation is from 30 to 60 days, it is highly advisable in a locality which has a previous record of rabies infection, such as Fresno has, that when a person has been bitten and the clinical symptoms indicate rabies in the inflicting animals, the Pasteur treatment be instituted at once, without waiting for a final diagnosis, which in some cases requires a number of days. This is especially true should the probable infection be on the face, head or hands, as it is a well-known fact that bites in these locations generally have a shorter period of incubation than bites on other parts of the body.

Time is an essential factor in the treatment of patients, and as it requires three weeks to administer the Pasteur treatment and another two weeks before full immunity is established, it can be readily seen why it is advisable to institute treatment as early as possible after the infection.

The shortest authentic record of incubation of which we have any knowledge was 13 days, and that was a child who was bitten on the face. The period of incubation is largely influenced by the following factors:

1. The extent and severity of the wound.
2. The nature of tissue involved. Rabies virus exerts its action upon the central nervous tissue, which it reaches by ascending the peripheral nerves. It is not surprising, therefore, to find that wounds or parts abounding in nerve terminations such as the fingers should be the most dangerous.
3. The distance of the wound from the central nervous system. Wounds about the head on this account are most likely to have a short incubation period, and hence demand immediate treatment.
4. Species of the biting animal. Bites of wolves, coyotes and cats are more dangerous than those of dogs.
5. Promptness and efficiency of cauterization.
6. Promptness with which antirabic treatment has been commenced.
7. It is held by some that wounds caused by teeth which have passed through several layers of clothing are less dangerous than those in which no such means has been afforded for the removal of virus.

PASTEUR TREATMENT

The Pasteur treatment is used as a preventive treatment of rabies during the incubation period. After symptoms of the disease are fully developed the Pasteur treatment is of absolutely no value, for there is no known cure for rabies. In a person who is taking the Pasteur treatment there is a contest of speed between the passage of virus from the wound to the brain by way of the nerves and the development of immunity by the action of the vaccine. It requires two weeks after the completion of the Pasteur treatment for the full development of immunity.

Just how long this immunity can be relied upon to afford protection against possible infection from a subsequent bite is not definitely known. Probably after the first month the degree of protection gradually diminishes. Therefore, after a few months have

elapsed, it is not safe to consider that sufficient protective substances remain in the tissues to combat possible infection from a second bite.

Microscopic examination of the animal's brain fails in about 3 per cent of cases to show lesions of rabies, and a considerable period of time may be required for a positive diagnosis to be made from the animal by the inoculation test. Hence, if Pasteur treatment for the bitten individual be delayed for a positive diagnosis, the disease may gain such headway that there will not be sufficient time to establish immunity. Therefore the safest procedure is to start the Pasteur treatment early (within a week after the biting if possible) without waiting for diagnosis to be made from the animal.

The Pasteur treatment covers a period of 21 days. The injections are given subcutaneously with an ordinary hypodermic syringe. It is advisable to alternate successive injections, using the subcutaneous tissues of the anterior abdominal wall and of the interscapular region, so that the vaccine will be well distributed and local reactions minimized. There need be no interruption of the patient's daily work, for the treatment can be administered in the patient's home or in the physician's office.

CARE OF PATIENT

The bowels should be kept freely open during the course of the Pasteur treatment, and the drinking of tea, coffee and alcoholic beverages allowed but sparingly. Exposure to cold, as well as excessive fatigue, should be avoided. Some local soreness, together with urticaria and erythema, may occur about the site of the injections. If this local reaction is marked, the application of a wet dressing of aluminum acetate solution will be found useful; or alcoholic solution of menthol or the classical calamine lotion may be used to good advantage.

RESULTS OF PASTEUR TREATMENT

The mortality among bitten individuals who do not take treatment is reported by various authorities as about 15 per cent. According to Stimson,¹ "in general it may be stated that the total mortality of bitten persons having received the antirabic inoculations is pretty constantly about 1 per cent, of which one-half could not, from the nature of the treatment, have been expected to live on account of the short time permitted for the establishment of immu-

¹ Bulletin 65, U. S. Hygienic Laboratory, Public Health Service, 1910.

nity. In other words, 0.5 per cent die of rabies within 15 days after the completion of the treatment that can not be charged to its failure but to a want of time to establish immunity."

The report of Viala² states that during the year 1918 there were 1,803 persons who took the Pasteur treatment at the Pasteur Institute in Paris, and of this number 3 died with rabies, making a mortality of 0.16 per cent. He also gives a table summarizing the results of the Pasteur treatment since its origin in 1886 up to 1918, inclusive. The table shows that during this period of 33 years 39,880 persons were treated, with a total of 140 deaths, or a mortality of 0.35 per cent.

PRINCIPLE OF PASTEUR TREATMENT

The principle upon which the Pasteur treatment is based is the production of immunity by the inoculation of rabies virus so modified as to render it innocuous. Pasteur first accomplished this by serial inoculation of monkeys, in which animal the virus loses its potency. Test animals inoculated with the spinal cord of these monkeys become immune to subsequent infection with virulent rabies virus. This method was, however, obviously inapplicable to man on a large scale. He finally devised the method at present in use, which involves the treatment of the virus in two steps; first, the serial passage of the virus in rabbits until a fixed degree of virulence is reached; second, the attenuation of this rabbit virus by desiccation.

WHO SHALL RECEIVE THE PASTEUR TREATMENT

Persons who have been bitten by rabid animals or who have had open wounds or scratches contaminated with the saliva of such animals should receive the treatment. At times the question has been raised whether persons who have drunk of the milk of rabid cows should be subjected to the preventive inoculations. While the possibility of infection by this means is extremely remote, there is some evidence that the virus can sometimes be present in the milk. On the other hand, infection through the intact mucosa of the alimentary tract is highly improbable, since the action of the gastric juice is destructive to the virus.

Persons bitten by animals presenting symptoms strongly suggestive of rabies should receive the antirabic treatment whether or not the suspicion is confirmed by histological examination and

² Annales de l'Institut Pasteur, July, 1919, p. 484.

pending the result of the inoculation test, if such is made. The necessity for treatment arises from the fact that rabies is really much more prevalent among animals than is generally suspected, and too much valuable time will be lost by delaying treatment for the result of animal inoculation.

Persons bitten by animals not showing any of the symptoms of rabies are not exempt from the necessity for treatment until the biting animal, which should be closely confined and carefully observed for certainly not less than two weeks, shall be shown to be free from the disease, since the saliva is known to be virulent sometimes several days before the onset of the symptoms, 4 to 5 days according to Roux and Nocard, 12 days according to Zagarro.

In this connection it is deemed pertinent to repeat that the histological examination is conclusive only when positive; that Negri bodies when demonstrable in the central nervous system are positive indication, according to present knowledge, that the animal was rabid; but the failure to find them does not exclude rabies, since they may not have developed to a demonstrable condition at the time the animal was killed, or they may have escaped detection through technical imperfections, or, finally, they may not be present in the portions examined even in well-developed rabies.

DILUTION METHOD

The dilution method, consisting of a suspension of the emulsified brain from rabbits injected with the fixed virus, is now being used extensively in the treatment of rabies in animals, and this treatment requires but 6 injections.

In the past year one laboratory alone supplied 1,200 such treatments, and only 7 cases of rabies developed among the treated animals. This must be considered a remarkable record in view of the fact that in practically all cases the treated animals were bitten by mad dogs.

Drs. W. M. Lynn, M. J. Kemen and B. N. Lauderdale were transferred from hog-cholera control work to tick eradication May 16, 1920. Since then Drs. A. A. Husman, J. W. Venable, B. F. Rossetter, W. G. Ross and H. H. Kettler have been transferred to the same line of work.

Dr. A. L. Bevan, on hog-cholera work in Mississippi, resigned from Bureau service, effective July 1, 1920.

CLINICAL AND CASE REPORTS

QUITTOR TREATMENT AS CARRIED OUT IN A FRENCH MILITARY HOSPITAL

By EDW. K. SALES, *East Lansing, Mich.*

WHILE on duty at the French Veterinary Hospital of Surgery located in the town of Rambervillers, France, during the fall and winter of 1917-18, I had an opportunity to see several radical quittor operations performed and to perform one or two myself. The results obtained from this operation by the French and the results obtained myself after leaving the French are the reasons why I make this attempt to explain this operation so that it will be available to those who might wish to attempt it.

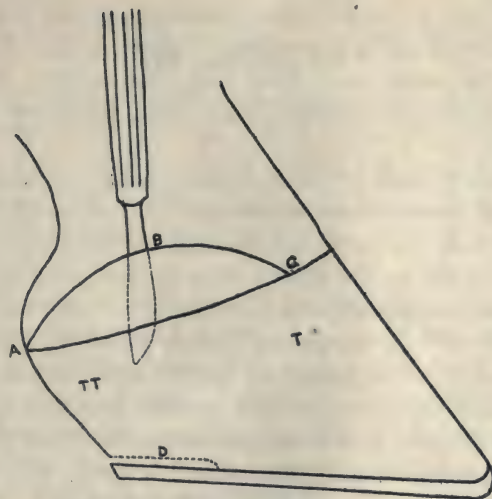
The object of the operation is to bring about a cure of quittor by completely removing the affected lateral cartilage. Recent cases are the most desirable ones to operate on, though the operation is very successful on chronic ones, providing attempts to cure with caustics have not been made. Where caustic treatment has been practiced without obtaining results there is usually so much fibrosis present that it is impossible to remove all the affected tissue, which is very necessary in order to obtain good results.

The instruments used are an elastic ligature to be used as a tourniquet, a razor, a sage knife with slight curve to blade (an ordinary straight scalpel may be used), a scalpel, a pair of tissue forceps, a medium-sized curette, an all-metal hoof knife and a pair of curved scissors.

The patient is placed in the recumbent position on a mat or pile of straw by means of a set of English hobbles, so that the affected cartilage is uppermost. The diseased limb is then freed, and if it is a hind limb it is drawn forward and made fast to the forearm of the upper fore limb, and if it is a fore limb it is drawn backward and made fast in a similar manner just above the hock of the upper hind limb.

The French used no anesthetic for this operation. Chloroform is to be recommended, though local anesthetics are successfully employed.

As soon as the patient is securely restrained, the area over and about the region of the lateral cartilage is clipped, washed with soap and warm water, and then shaved. When dry the immediate



French Operation for Quittor.

T, area where thumb is placed.

TT, area where thumb is placed were it necessary to make the incision from C to A instead of from A to C as described.

A-B-C indicates upper border of first incision.

A-C indicates dorsal border of coronary band where second incision is made.

D indicates portion of hoof removed to relieve pressure on affected quarter. (Not absolutely necessary.)

operative area is painted with tincture of iodine. The elastic ligature (a piece of small rubber tubing makes a very good one) is then applied very tightly around the middle region of the pastern. This controls the hemorrhage to such an extent that the operation is practically bloodless.

The operator, kneeling at the extremity of the affected limb, takes the sage knife or large straight scalpel with the right hand, the thumb of which is placed firmly on the hoof at the area marked T on the illustration. The point of the knife is then forced through the skin and tissues at point A just above the coronary band. Keeping the blade parallel with the inner surface of the lateral cartilage, and with the point inserted deep enough so that it is at or near the inner ventral border of the cartilage, a circular incision is made as indicated by line A-B-C. The knife is now removed from this first incision, and a second incision through the skin and tissues to the cartilage is made along the dorsal border of the coronary band as indicated by line A-C. The knife is now replaced in the first incision with the handle held horizontal with the coro-

nary band, and as much of the cartilage with the skin and tissue over it is scooped out as is possible. The remainder of the cartilage is removed by means of the hoof knife and curette. It is essential to remove the entire cartilage, care being taken not to open the coffin joint.

The coronary band is not molested during the operation unless it is diseased, in which case the diseased portion should be removed.

If the quittor has burrowed through the cartilage, leaving foci of infected areas in the tissues beneath the cartilage, these foci should be well cauterized with a stick of silver nitrate. The wound is then painted with tincture of iodine and filled with powdered boric acid, over which plenty of sterile cotton is placed and held there by means of gauze bandages applied very snugly.

The first dressing is left without being disturbed for 48 hours, when it is removed and replaced with a fresh one. During the first few dressings one must be sure that the bottom of the wound is well swabbed out with dry sterile cotton.

If there is a tendency for granulations to form, this may be overcome by applying the bandages more tightly and adding a little iodoform to the boric acid, which tends to keep the wound less moist.

Very few bad after-effects follow this operation. Infection seems to play a very important part, as there is almost perfect drainage and the wound heals rapidly. At the end of three weeks following the operation there is little more than a simple skin wound left, and the patient can be returned to work completely cured at the end of the fifth to sixth week.

I believe this operation is more practicable than any other radical operation for quittor, as it only takes from 10 to 15 minutes to perform it; the hoof is not mutilated in any manner, making it a very easy and simple operation to perform; and lastly, as good results have been obtained by this method as by any other radical method.

In honor of the late Prof. A. Liautard, his daughter, Madame Boyer, has given to the Alfort Veterinary School of France a fund of 5,000 francs, from the proceeds of which an annual prize of 250 francs, to be known as the Liautard prize, is to be awarded to the fourth-year student submitting the best paper based on his clinical work.

ABSTRACTS

HOW A DOG OF HEALTHY APPEARANCE CAN TRANSMIT RABIES. P. Remlinger. *Bul. Soc. Cent. Méd. Vét.*, June, 1919, p. 175. Abstract in *Rev. Gén. Méd. Vét.*, Aug., 1919, p. 440.

In a communication on the treatment of rabies in 1907, Remlinger drew attention to the possibility of the transmission of rabies by healthy dogs.

Several observations of this sort have been published, but all of these cases can be criticised for many reasons: The diagnosis of rabies has been incorrect; the person bitten could have been infected by some other dog than the one incriminated; the biting dog, pronounced healthy, could have been a carrier of virulent saliva from a rabid dog (lips, tongue, teeth contaminated by droolings from another dog); finally, according to Babes, the biting dog could be cured of the abortive manifestations of rabies.

The experimental studies of Konradi and Remlinger on the passage of rabies from mother to fetus permits viewing the question in a different light.

Konradi inoculated rabies virus into guinea pigs and rabbits; after a varying number of days (18 to 88), these animals gave birth to absolutely normal young. At the end of from 80 to 90 days the young succumbed to rabies. At this time the mothers were in perfect health and it was only much later, 164 to 487 days afterwards, that they showed symptoms of rabies.

The author being a little skeptical about these facts, verified them experimentally.

Two guinea pigs, a male and a female, were inoculated with street virus and placed in the same cage; on the 13th day the male showed the first symptoms of paralytic rabies; it died on the 16th day. The female remained well, giving birth to three young 50 days after the inoculation. One of these died after 13 days without the cause of its death being determined. The other two remained well up to the 32nd day. On this date they showed symptoms of generalized paralysis and died on the 34th day. The autopsy was negative; their brains and bulbs were inoculated into two guinea pigs which died of rabies. The mother, which had remained well, died of rabies on the 39th day after the death of the young, or 123 days after its inoculation and 69 days after parturition.

The rabbit and guinea pigs are able to transmit rabies to their

young in utero, although they themselves are healthy. Konradi observed experimentally an analogous phenomenon in the dog and concluded that in so far as the transmission of rabies from the mother to the fetus is concerned, this is to say, the presence of the rabies virus in the blood, difference of species does not seem to be a factor.

From experiments made with street virus, one can infer that the phenomena observed in the laboratory may be duplicated in nature. It seems possible that the saliva, which really should receive its virulence from the blood, is virulent at an undetermined period before the appearance of the first symptoms of rabies.

Remlinger draws the following conclusions:

1. There exists in rabies well before the appearance of symptoms a latest blood phase which does not manifest itself by any symptoms other than perhaps some slight fever.
2. At this stage the female can transmit the disease to its young through the placenta (undeniable proof of her being infected). It seems proper to infer that she is equally able to infect man or animals by means of the saliva.

This last point should be demonstrated experimentally, but this presents considerable difficulties, although not insurmountable.

L. T. GILTNER.

THE WHORLED MILKWEED (*ASCLEPIAS GALIODES*) AS A POISONOUS PLANT. C. Dwight Marsh, A. B. Clawson, J. F. Couch and W. W. Eggleston. Bul. 800, U. S. Dept. Agr., 1920.

The whorled milkweed (identified botanically as *Asclepias galioides*, cited in previous publications as *A. verticillata*) ranges northward from Central America through Arizona and New Mexico to central Utah and central Colorado. Its natural habitat is the dry plains and foothills. Its downy seeds are adapted to wind dispersal, but in the irrigated orchards and fields, where it is becoming abundant, the rapid increase has been due largely to water transportation of the seeds along the irrigating ditches.

Feeding experiments demonstrated that the plant is exceedingly poisonous to horses, cattle and sheep, but most of the reported losses have been of sheep. Generally the first evidence of intoxication is the loss of control of the muscles. The animal staggers when walking and eventually falls and is unable to rise. Sometimes it is found down before any other symptoms appear. At this time in most cases there is salivation and there may be marked trembling.

Usually there is a pronounced elevation in temperature soon after the first symptoms appear. The most marked symptoms are violent spasms at short intervals. As the illness proceeds, in the intervals between the spasms, while lying upon its side, the animal moves its legs as though walking or running. The spasms become less intense and death comes from respiratory paralysis. Bloating caused by gas is one of the most noticeable features of poisoned sheep. Autopsy and microscopical examination show congestion of the peripheral blood vessels, the congestion being especially marked in some glands, the lungs and the central nervous system.

The chemical examination of the plant, while incomplete, has demonstrated the existence of definite toxic compounds, part of which are glucosidal in nature. The plant contains also a minute quantity of nontoxic alkaloid.

There is no medicinal remedy which gives satisfactory results. Reliance must be placed on the destruction of the plant and such care of stock as will prevent hungry animals from coming into contact with masses of the weed.

CHRONIC EMPHYSEMA OF THE LUNGS FOLLOWING FOOT-AND-MOUTH DISEASE. *Tijdschrift Voor Diergeneeskunde*, vol. 46, part 21.

Permanent affections of the udder and deformities of the feet frequently follow outbreaks of foot-and-mouth disease. In addition to these, chronic emphysema of the lungs is a serious and frequent sequel. After an outbreak of foot-and-mouth disease the number of cattle with affected breathing is enormous, even among herds that have passed through the epizootic in the open pasture.

If the cattle are in the stable while sick, the vesicles in the mouth may prove benign. Very different terminations may be expected during the dry weeks of May and June. Some outbreaks leave more permanently affected cattle behind them than others. Thus the epizootic of 1911 was remarkably malignant, and a large number of animals suffering from resultant diseases was left behind after the acute stage of the outbreak had been overcome.

The number of emphysematous cattle is small among those that have been treated with serum immediately on the first appearance of the disease. This apparently indicates that there is a relationship between the affection of the lungs and the virus of foot-and-mouth disease.

It is well known that during May and June the temperature

variations between day and night are very great and that cattle affected with aphthous fever during these months suffer greatly from bronchial catarrh.

The writer had opportunity to study a typical case occurring in a registered cow that had been treated with serum, yet had developed pleuritis. She was placed in the stable before any of her vesicles had ruptured. Her temperature rose to 40.8° C. Appetite was diminished. After 14 days the animal had recovered from the visible indications of foot-and-mouth disease, but was only giving about one-third of her usual flow of milk. Auscultation showed nothing abnormal, but on percussion a more or less tympanitic tone was evident.

A few weeks later it was noticed that the animal, although presenting a very good outward appearance, was breathing rapidly. She appeared to be asthmatic and showed the symptoms usually shown by asthmatic cattle after foot-and-mouth disease.

A large number of cattle at this time were affected with myocarditis, and it is possible that foot-and-mouth virus can affect the various organs of the thoracic cavity. This is the case with other infectious diseases.

Emphysema is not rare among cattle. But the cases commonly occurring present very mild symptoms. Sufferers from the disease as a sequel to foot-and-mouth disease, however, show an abnormally heavy growth of hair over the entire body. This hair is rough and dull and never smooth and attractive. The writer has seen some hides that reminded him of the skin from a bear.

In the writer's practice there are herds of cattle in which more than half of the animals are affected with emphysema of the lungs. These animals are of little value to their owners, because they are affected with an incurable disease and their flow of milk remains perceptibly at less than half of their normal production.

Every method of treatment stands powerless before this disease. The affected cattle do not cough. They have accelerated breathing. In warm weather they stand with nostrils dilated, foam dropping from the nasal cavities, and sometimes with the mouth opened. On auscultation, superficial respirations are noted. Tympanitic sounds are detected on percussion.

In the 1911 epizootic it was observed by the writer that those cattle suffering from emphysema following foot-and-mouth disease were able to transmit the latter disease for months. They are therefore infection carriers. This fact is of great importance and

proves that emphysema is one of the sequels of an outbreak of foot-and-mouth disease.

H. J. WASHBURN.

OBSERVATIONS ON THE LIFE HISTORY OF ASCARIS LUMBRICOIDES.

B. H. Ransom and W. D. Foster. U. S. Dept. Agr. Bul. 817 (1920), 47 pp., 6 figs.

Recent investigations by Stewart, Yoshida, and the writers of the present paper have resulted in a revision of former ideas as to the life history of the common intestinal roundworm (*Ascaris lumbricoides*) of man and the related and probably identical form (*Ascaris suum*) parasitic in the pig. It was formerly assumed that after the young worms had hatched in the intestine from the eggs swallowed with food or water by a human being or pig they settled down and developed to maturity. Stewart found that if the eggs after proper incubation are fed to rats or mice they hatch in the intestine, but that the larvæ instead of settling down at once migrate out of the intestine and pass to the liver, lungs, and occasionally the spleen, meanwhile undergoing growth and development. Those that reach the lungs pass up the trachea, down the esophagus, through the stomach, into the intestine, linger in the large intestine and cecum for a few days, and finally pass out of the body in the feces. Migration up the trachea is well established in 7 to 10 days after the eggs are ingested, and the total period of migration extends over about 2 weeks.

Stewart assumed that the behavior of the parasite in rats and mice indicated that these animals play the part of necessary intermediate hosts, and that human beings and pigs become infected as a result of swallowing food or water that has been contaminated by the feces or saliva of infested rats or mice. Ransom and Foster, however, have demonstrated that infection of the usual hosts (man, pig) results from ingestion of the eggs, that the larvæ undergo the same sort of migration that they do in rats and mice, and that instead of finally leaving the body in the feces the larvæ after migrating through the lungs establish themselves in the small intestine and develop to maturity. About 2½ months is required for the worms to become mature after the eggs are swallowed. The failure of the parasites to establish themselves in the intestine after their migration through the lungs in rats, mice, guinea pigs, rabbits, etc., is simply an expression of an imperfect adaption of the parasites to these hosts. In sheep and goats, which are better adapted as hosts than smaller animals (rats, guinea pigs, etc.), the parasite may estab-

lish itself in the intestine and survive for considerable periods (over 3 months at least), and approach, though apparently it never reaches, fertile maturity. As first observed by Stewart the migrating larvæ in passing through the lungs cause considerable damage, and heavily infested animals, including young pigs as well as smaller laboratory animals, commonly die as a result of the lung invasion in a week or ten days after ingesting the eggs. Undoubtedly many of the cases of so-called "thumps" in young pigs are caused by *Ascaris* larvæ, and it is also not unlikely that in some of the lung troubles of obscure etiology among children *Ascaris* larvæ will be found to be involved.

In view of the great prevalence of *Ascaris* infestation among swine it is evident that the new knowledge that has been gained concerning the life history of this parasite has a highly important bearing upon the problem of reducing losses from swine diseases. It is to be hoped that in the future more attention will be paid to the matter of eradicating and controlling *Ascaris* than has commonly been done in the past. There can be no question that a little care in this respect on the part of swine breeders generally will result in a very great reduction in the huge losses that are now caused every year by *Ascaris* infestation.

B. H. RANSOM.

REVIEW

PARASITES AND PARASITOSIS OF THE DOMESTIC ANIMALS. THE ZOÖLOGY AND CONTROL OF THE ANIMAL PARASITES AND THE PATHOGENESIS AND TREATMENT OF PARASITIC DISEASES. By B. M. Underhill, Professor of Parasitology and Instructor in Zoölogy and Histology, School of Veterinary Medicine, University of Pennsylvania. One volume of 379 pages, 172 text figures, and 8 plates. The Macmillan Company, publishers, New York.

In this work, as intimated in the preface, the author has endeavored to present the subject systematically, concisely, and simply, and in a manner that he considers will best meet the needs of the student and practitioner. The book is a great improvement over works heretofore published in the United States and designed for use as text-books in teaching the subject of veterinary parasitology. Some important and well-established facts have been omitted that might have been included, and some minor errors have been made, but these defects will undoubtedly be remedied in future editions.

For example, no reference is made to the work of Van Saceghem, Bull, Hill or Ransom on the life history of *Habronema*, the oil of chenopodium treatment for ascariasis is not mentioned, the hookworms of cattle and sheep are listed as only occasional parasites, it is stated that the eggs of *Syngamus trachealis* "can not be extruded and are only liberated by the rupture or disintegration of the mother worm" (notwithstanding another statement on the same page relating to Railliet's observations that the eggs are deposited through the vulva and escape from beneath the bursa of the male), the only cyclostome of the horse that is mentioned is *Cylicostomum tetracanthum*, no mention is made of *Triodontophorus tenuicollis* which causes conspicuous ulcers in the colon of the horse, and Kilborne alone is credited with the discovery of the transmission of Texas fever by the tick.

The book is very well printed and bound considering the present-day difficulties with which book publishers have to contend. Supplementing the illustrations that have been gathered from the works of other authors are a few original illustrations; some of these, especially the photomicrographs, could be greatly improved.

B. H. R.

Dr. O. B. Hess, formerly in charge of the Division of Hog Cholera Control and now with the Fort Dodge Serum Company, was a visitor at the Washington offices late in May.

Dr. C. T. Tawney has been transferred from hog-cholera control work in Michigan to quarantine inspection with official headquarters at Bismarck, N. D.

Dr. W. N. Cochran has resigned his position with the Swan-Myers Company of Indianapolis, Ind., and has engaged in practice at Belzoni, Miss.

Dr. A. H. Logan is being transferred from educational hog-cholera work in Florida to hog-cholera control work in South Carolina.

Dr. Frank B. Jones is transferred from hog-cholera control work in Missouri to virus-serum inspection at Kansas City, Mo.

Dr. F. P. Miller is transferred from hog-cholera work in North Carolina to virus-serum inspection at East St. Louis, Ill.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Program of the Fifty-Seventh Annual Meeting

The following is a tentative program as arranged for the Fifty-seventh Annual Meeting of the American Veterinary Medical Association to be held in Columbus, Ohio, August 23 to 27, inclusive. The final arrangement of time for the sessional and general programs will be made in the official program that will be sent out to all members about the first of August.

The program will open August 23 at 10 a. m. at Memorial Hall with an address of welcome and response, followed by the President's address, reports of Executive Board, Secretary, Treasurer and committees. For the general program, the following subjects will be presented:

PROGRAM FOR THE GENERAL SESSIONS

Veterinary Education and Its Readjustment.

Dr. C. D. McGilvray Toronto, Canada.

The Relation of the Agricultural Press to the Veterinarian.

Mr. E. S. Bayard, Editor of the *National Stockman and Farmer*, Pittsburgh, Pa.

Sound Live-Stock Sanitary Laws; Their Value to the Farmer and Breeder.

Hon. H. H. Halladay, Commissioner of Animal Industry, Lansing, Mich.

The International Exchange of Live Stock.

Mr. G. F. Finlay, Walter-and-Eliza-Hall Veterinary Research Fellow of Sydney University, Australia.

The Responsibility Confronting the Veterinary Profession.

Dr. William Herbert Lowe, Paterson, N. J.

Dollars versus Health.

Dr. William Thomson, Quarantine Inspector, Kere-meos, British Columbia.

The Horse and Mule; Their Indispensability to Mankind.

Wayne Dinsmore, Secretary, Horse Association of America, Chicago, Ill.

Municipal Milk Supply.

Lieut. Col. D. S. Tamblyn, Regina, Saskatchewan, Canada.

Injustice Done Bureau Veterinarians by Congressional Reclassification Commission.

Dr. J. A. Kiernan, Washington, D. C.

Administration of the Meat Inspection Law by the Bureau of Animal Industry During the War.

Dr. W. N. Neil, Chicago, Ill.

The Micro-Particles of the Blood and Other Body Fluids.

Profs. S. H. Gage and P. A. Fish, Ithaca, N. Y.

The Production and Inspection of Veterinary Biologics.

Dr. D. I. Skidmore, Washington, D. C.

PROGRAM FOR SECTION ON GENERAL PRACTICE AND SURGERY

First Session

Chairman's Address.

Dr. H. E. Bemis, Ames, Iowa.

French and American Practice Compared.

Dr. L. A. Merillat, Orrville, Ohio.

Anesthesia in Veterinary Operations.

Dr. R. R. Dykstra, Manhattan, Kans.

The Therapy of the Endocrine Glands.

Dr. E. L. Quitman, Chicago, Ill.

Some Practical Points on the Anatomy of the Ox and Pig.

Dr. H. S. Murphey, Ames, Iowa.

Traumatic Indigestion in Cattle.

Dr. D. H. Udall, Ithaca, N. Y.

Discussion led by Dr. T. H. Ferguson, Lake Geneva, Wis.

Swine Diseases.

Drs. C. H. Stange and Charles Murray, Ames, Iowa.

Cæsarean Section on Swine.

Dr. W. E. Macklin, Coon Rapids, Iowa.

Second Session

Prolapse of the Vagina and Uterus in Brood Bitches and of the Rectum in Puppies; Their Causes and Treatment.

Dr. J. C. Flynn, Kansas City, Mo.

Diagnosis and Treatment of Certain Skin Diseases of Dogs.

Dr. H. J. Milks, Ithaca, N. Y.

Verminous Colitis of Dogs and Its Medical and Surgical Treatment.

Dr. Frank H. Miller, New York, N. Y.

Kennel Hygiene and Breeding.

Dr. E. D. King, Mobile, Ala.

Sclerostomiasis in Horses.

Dr. C. E. Covault, Ames, Iowa.

Amputation of the Penis; Report on 100 Cases.

Major W. J. Ratigan, Camp Funston, Kans.

Treatment of Cryptorchidism.

Dr. E. E. Wegner, Pullman, Wash.

PROGRAM FOR SECTION ON SANITARY SCIENCE AND POLICE

First Session

Chairman's Address.

Dr. L. Enos Day, Chicago, Ill.

Secretary's Report.

- Dr. H. Preston Hoskins, Detroit, Mich.
- Eradicating Tuberculosis in Pennsylvania.
Dr. Samuel E. Bruner, Harrisburg, Pa.
- Combination Tuberculin Tests.
Dr. Henry W. Turner, New Hope, Pa.
- The Preparation of Tuberculins.
Drs. Fred Boerner, Jr., and Miller F. Barnes, Philadelphia, Pa.
- The Superiority of Combination Tuberculin Tests over any Other Method.
Dr. L. B. Ernest, Washington, D. C.
- Discussion of Papers on Tuberculosis, opened by
Dr. Veranus A. Moore, Ithaca, N. Y.
- Activities of the Bureau Laboratories in Washington.
Dr. J. S. Buckley, Washington, D. C.
- The Bacterial Content of the Genital Tract of Cows and Its Relation to Calf Infections.
Dr. C. M. Carpenter, Ithaca, N. Y.
- Some Studies in Infectious Abortion.
Dr. I. F. Huddleson, East Lansing, Mich.
- Infectious Abortion Studies.
Drs. B. T. Simms and F. W. Miller, Corvallis, Oreg.
- The Restraint of Abortion Disease in Cattle.
Dr. J. P. Turner, Washington, D. C.
- Equine Infectious Abortion.
Dr. R. A. Kelser, Washington, D. C.
- Abortion and Sterility in Swine.
Dr. J. W. Connaway, Columbia, Mo.

Second Session

- Susceptibility to Cholera of Young Pigs from Immune Mothers.
Dr. E. M. Pickens, College Park, Md.
- Field Observations in the Control of Infectious Swine Diseases.
Dr. M. Jacob, State Veterinarian, Nashville, Tenn.
- Protozoan Forms and Their Relation to Diarrhea and Colitis in Shoats.
Dr. W. W. Dimock, Lexington, Ky.
- Discussion of Papers on Swine Diseases, opened by
Dr. R. R. Birch, Ithaca, N. Y.
- The Control of Anthrax in the Canal Zone.
Dr. W. J. Taylor, Cristobal, Canal Zone.
- The Dissemination of Anthrax Infection through Industrial Sources.
Drs. A. Eichhorn, Pearl River, N. Y., and A. L. Edmunds, Franklin Falls, N. H.
- The Therapeutics and Prophylaxis, of Contagious Epithelioma of Fowls.
Dr. J. R. Beach, University Farm, Davis, Calif.

Bovine Coccidiosis in British Columbia.

Dr. E. A. Bruce, Agassiz, British Columbia.

Botulism in Cattle.

Drs. Robert Graham and H. R. Schwarze, Campaign, Ill.

Rhabdomyoma in Sheep.

Dr. L. E. Day, Chicago, Ill.

Election of Officers.

PROGRAM FOR THE SECTION OF FACULTIES AND EXAMINING BOARDS

Remarks by Chairman.

Dr. Reuben Hilty, Toledo, Ohio.

Report of Secretary.

Dr. H. S. Murphey.

1. College Training for B. A. I. Veterinarians.

Dr. John R. Mohler, Chief, Bureau of Animal Industry, Washington, D. C.

- a. Meat Inspection.

- b. Quarantine.

- c. Investigation.

- d. Educational Field Work.

2. Training of Veterinarians for City Food Inspection.

Dr. R. J. Carver, Columbus, Ohio.

3. Veterinary Training from the State Board Standpoint.

Dr. C. W. Fogle, Leipsic, Ohio.

4. Training of Veterinarians for General Practice.

Dr. J. F. Planz, Akron, Ohio.

- 4a. Training of Veterinarians for General Practice.

Dr. C. E. Cotton, St. Paul, Minn.

5. The Future Training of Veterinarians Particularly for Teaching Work.

Dr. D. S. White, O.S.U., Columbus, Ohio.

6. Ideal Laboratory and Clinical Training at the Present Time.

Dean C. H. Stange, Ames, Iowa.

7. The Training of Veterinarians for Research.

Dr. Theobald Smith, Rockefeller Institute, Princeton, N. J.

8. Animal Husbandry in the Veterinary Curriculum.

Dr. George A. Dick, West Philadelphia, Pa.

9. To Choose Title.

Dr. Otto Faust, Poughkeepsie, N. Y.

10. Entrance Requirements.

Dr. Charles D. McGilvray, Toronto, Canada.

ENTERTAINMENT

The local committee and veterinarians of Ohio have arranged an unusually fine program for the entertainment of the ladies. The following is an outline:

Monday, August 23, at 8 o'clock p. m., the President's Reception in Ball Room of Deshler Hotel, followed by dancing. Fruit punch will be served.

Tuesday afternoon, August 24, at 2 p. m., Ohio Clover Leaf Party for ladies. Committee in charge: Mrs. Brumly, Mrs. Lambert and Mrs. Hyde. An entertainment will be furnished, including readings, singing and dancing, and a lunch will be served.

Wednesday, August 25, movie party at Southern Theatre, in charge of Mrs. Brown. Full orchestra will be in attendance, with soloists.

Wednesday evening, August 25, at 7:45 p. m., at Coliseum Fairgrounds, for men and women. A dancing pageant with 600 performers, accompanied by large military band.

Thursday, August 26, for ladies only, picnic, with refreshments, at the Spring in University grounds.

Thursday evening, August 26, banquet and cabaret at Deshler Hotel, for men and women. The Hon. Rowland C. Baggett, of Dayton, to deliver the principal address at banquet. Cabaret will be put on during banquet, consisting of singing and other amusements.

Two large busses that will carry fifty people will be in attendance in front of the Deshler Hotel at all times during the meeting, for sight-seeing trips around Columbus.

LADIES' AUXILIARY OF THE A. V. M. A.

Meeting, Monday Afternoon, at 2:30 p. m.

Opening Prayer, Mrs. F. H. Schneider, Philadelphia.

Address of Welcome, Mrs. T. A. Burnett, Columbus.

President's Address, Mrs. W. H. Hoskins, New York.

Reports of other Officers:

Recording Secretary, Mrs. C. E. Cotton, Minneapolis.

Treasurer, Mrs. T. E. Smith, Jersey City.

Corresponding Secretary, Mrs. A. Lockhart, Kansas City.

Papers by:

Mrs. C. A. Cary, Auburn, Ala.

Mrs. W. H. Lowe, Paterson, N. J.

Election of Officers.

FROM THE SECRETARY'S OFFICE

LETTERS have been sent to all Resident Secretaries of the A. V. M. A. for the various States and Provinces urging them to get all eligible veterinarians to send in their applications for membership as soon as possible. All applications should be in by August 1.

The progress and welfare of the A. V. M. A. depend largely upon the efforts of each individual member. You should try to secure at least one new member—more if you can.

The program is being arranged, and it is an unusually fine one that will appeal to every practitioner. A copy of the printed program will be sent to every member by August 1 with a statement for dues for the coming year. The program will also appear in the August number of the JOURNAL.

There are also a number of important questions dealing with the future policy of the A. V. M. A. that will be presented to the members at the Columbus meeting.

Every member of the A. V. M. A. should make a special effort to attend the Columbus meeting, August 23-27, as it promises to be the largest veterinary association meeting ever held and we believe it will be the best.

N. S. MAYO, *Secretary.*

THE SHRINE CLUB OF THE A. V. M. A.

List Ye Shereefs to the Muezzin's Call:

A great caravan is forming to cross the desert to the Oasis of Columbus, on the Olentangy River, where the nobility of Aladdin Temple have their being. Inshallah, we shall hold forth there on August 23-27, 1920. Learned hakins and pundits, scholars all, will discourse on the make-up and habits of the camel, that noble ship of the arid desert.

So gird up your loins—slip into your sandals—cover your body with a clean yekel—rewind your tarboosh about your brow—bring the queen of your harem—let your oldest mother-in-law take care of the house—mount your best camel and come to Columbus, O-H & a IO, an oasis where the date plam flourishes and where mayhap or perhap—at so much a hap—sparkling waters from the fountain that is at Zem-Zem can be had.

And may Allah permit all Shereefs to gather on these dates that justice may be meted out.

It is written.

C. J. BECKER, *Secretary.*

Dr. Robert D. Wall on July 1 resigned his position as State Veterinarian of Iowa to engage in private practice at Des Moines. His place will be taken by Dr. Peter Malcolm of New Hampton.

Dr. E. M. Wiggs resigned as State Veterinarian of Texas on July 1 and will engage in the dairy cattle business at Mineral Wells, Texas. He has been succeeded by Dr. L. G. Cloud of Fort Worth, Texas.

OTHER ASSOCIATIONS

WORLD WAR VETERINARIANS OF AMERICA

Attention is called to the annual meeting of the World War Veterinarians of America, which is to be held in connection with the annual convention of the American Veterinary Medical Association at Columbus, Ohio, August 23 to 27 inclusive, the exact meeting date to be announced at Columbus.

The prospects of this meeting are causing much enthusiasm, and it is necessary that those who have not shown a great interest up to the present time execute a right-about-face! Come to the meeting and help in the constructive work that will take place in August at Columbus. A constitution is to be adopted, officers elected for the ensuing year, and definite plans formulated for the year 1921. Features of interest to veterans of the war are being arranged, such as moving pictures of veterinary affairs at home and in France, obtained from the War Department, beside sociable get-together meetings, etc.

The present officers of the W. W. V. A. will all be there, besides a host of other ex-service veterinarians, whom you will be glad to see.

This is your Association; it is for your benefit; therefore help make it function and be useful to you.

COL. L. A. MERILLAT,
National Commander.

CAPT. J. V. LACROIX,
Assistant National Commander.

LIEUT. A. A. LEIBOLD,
National Adjutant.

VETERINARY CLUB OF PHILADELPHIA

AT the last meeting of our club the following resolution was unanimously adopted:

Resolved:

1. That the Veterinary Club of Philadelphia approves fully of the organization and good work of the Horse Association of America, an Illinois corporation, national in character, with headquarters in Chicago, Illinois.

2. That this club become a member of the Horse Association of America and take one share at \$5 per share.

3. That the members of the club be recommended to become members of the Horse Association of America and to solicit their patrons and friends who are interested in horses to help to the extent of one or more shares.

4. That the members of this club designate Dr. George A. Dick to represent them on the Advisory Board of the Horse Association of America.

C. S. ROCKWELL, *Secretary*.

COLORADO VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Colorado Veterinary Medical Association was held at Fort Collins on Wednesday, May 26, followed by two days of a practitioners' short course, which was the first of these events held in Colorado. Practically speaking the short course was a continuation of the Association meeting and was held under the auspices of that organization. A good representation of the practitioners of the State was present for the three-day session.

Visitors from out of the State who took part in the program were Dr. H. E. Bemis of Iowa, Dr. W. L. Boyd of Minnesota, and Drs. A. T. Kinsley and C. E. Salsbery of Kansas City.

The address of welcome was made by Dr. Charles A. Lory, President of the Colorado Agricultural College, and responded to by Dr. Charles Lamb, State Veterinarian.

The president's address by Dr. A. N. Carroll pointed out particularly the necessity of the State coöperating with the Government in the accredited herd plan of eradicating tuberculosis. He urged that more attention be given to uniformity in the matter of fees, and also that an urgent invitation to the American Veterinary Medical Association to meet in Colorado in 1921 be extended at the Columbus meeting. Seven new members were added to the roll.

The matter of sterility and abortion was ably handled by Dr. W. L. Boyd in three lectures and two demonstrations on sterile cows.

The surgical work was in charge of Drs. Bemis and Kingman. Dr. Bemis demonstrated his nerve blocking and his operations for fistulous withers, and removal of the nasal septum. Several other operations were performed.

Dr. Bemis also read a paper on "Cæsarian Section in Sows." "Swine Diseases" were discussed by Dr. A. T. Kinsley with some demonstrational material.

Dr. C. E. Salsbery read a paper on "Infectious Keratitis of

Cattle," in which he stated that investigations carried on by their laboratories had revealed two organisms commonly present in this disease, namely, *B. pyogenes bovis* and *B. bovisepiticus*.

Dr. A. G. Fisk discussed "County Veterinary Societies" with particular relation to the new one which has been formed in Weld County, Colorado.

The entertainment consisted of a picnic lunch given by the American Veterinary Supply Company on the first day of the meeting, and the annual banquet and ball held on the evening of the 26th.

Altogether the practitioners' short course was highly successful and will probably become an annual event.

I. E. NEWSOM, *Secretary*.

Dr. J. B. Reidy, of Houston, Texas, is now located at Augusta, Me., in charge of tuberculosis eradication work for the Bureau of Animal Industry in coöperation with Dr. W. H. Lynch, State Live-Stock Sanitary Commissioner.

The force of Bureau of Animal Industry veterinary inspectors has been increased at Little Rock, Ark., by the addition of Drs. Grover C. Pieper, Wella E. Hopkins and Charles M. Bell.

Dr. Harry K. Copithorn, of Boston, Mass., has been attached to the force of the Quarantine Division of the Bureau of Animal Industry at Calais, Me., for the inspection of animals imported into the United States.

A Connecticut live-stock owner who recently enrolled in the "Better Sires—Better-Stock" movement reported 231½ cattle kept for breeding. Twenty-three of the animals are purebred cows; the fraction represents a half interest in a purebred bull.

Dr. William P. Jackson, Chico, Calif., has been appointed Resident Secretary, to succeed Dr. C. M. Haring, resigned. Dr. Haring did not feel that he could give the necessary time to the work.

Dr. William E. Muldoon, Manhattan, Kans., has been appointed Resident Secretary for that State, to succeed Dr. J. H. Burke, who resigned.

COMMUNICATIONS

LETTERS OF APPRECIATION

DR. W. H. DALRYMPLE:

My dear and much honored Colleague—Our committee at its last meeting received the cablegram which you together with Drs. Mohler and Eichhorn were kind enough to send me from New Orleans at the occasion of the meeting of the American Veterinary Medical Association.

So long accustomed to so much cordiality and generosity from your grand country, our committee was by no means surprised at the decision of your strong association. But it found a new proof, particularly touching, of the eternal esteem and affection which steadily unite our two nations. It has requested me to express to the American Veterinary Medical Association its sentiments of profound gratitude.

Our committee pronounced the closing of its public subscriptions on the first of January last. It has also decided that its financial intervention shall not go further than this season and terminate on the first of May, 1920. Besides, at that time all the money we have collected shall have been paid out, and the mild season will make existence less hard for our unfortunate brothers who have suffered so much from the winter in the devastated regions.

Our mission being terminated, I shall not, on behalf of the committee, fail to keep you posted as to the use of our funds and those which we owe to your generous contribution. H. VALLEE.

Alfort, France.

DR. A. EICHHORN:

My Dear Colleague—I wish to acknowledge the receipt of your highly esteemed letter of March 12th, and hasten to express in the name of the High School and also for myself the deepest appreciation and thanks for your readiness and sympathy which you have shown towards our cause. Although the appeal you have made in the JOURNAL over-estimates my modest activity along professional lines, and although I regret that Professor Marek has not been given due recognition in the same, as he has a great share in the publishing of our Special Pathology and Therapeutics, nevertheless I have taken cognizance of the appeal with the deepest gratitude

and hope that the same will arouse among our American colleagues the deserved sympathy for our country.

In my letter I have only requested periodicals and other publications. If, however, according to your appeal financial contributions should be received, we would utilize the same for the procurement of books and instruments for our students, who at the present time are not in a position to obtain them; or the funds may be administered as a "Fund of American Veterinarians" by the veterinary colleagues. In the meantime we received the *JOURNAL of the American Veterinary Medical Association* and also the *American Journal of Veterinary Medicine*. They will be placed in the library of our college as presents of the publishers.

Thanking you for your very friendly and kind support, I am, with personal regards,

Sincerely yours,

Budapest, Hungary.

PROFESSOR HUTYRA.

THE ARMY BEHIND THE ARMY

There follows an extract from a recent book entitled "The Army Behind the Army," by Major E. Alexander Powell, U. S. A., published by Charles Scribners Sons, 1919. The work may be considered as quasi-official inasmuch as the preface states that it is published by permission of the Secretary of War and with the coöperation of other officials.

To me, and I think it will be to other veterinarians, it is a source of real gratification to read a public acknowledgment of a service well performed by the Army veterinarian. It is not news to the profession, but undoubtedly it is to the general public. I might add that it is additionally gratifying, coming as it does from a source that in years past has shown no great love for the veterinarian.

"I doubt if any branch of the Army did more efficient work in its respective line, and received less credit from the public, than the Veterinary Corps. This lack of appreciation was due, in the first place, to public ignorance of the duties of the corps and the character of its personnel.

"Most people associate a veterinarian with the old-time horse doctor, of rough speech and still rougher manner, who was known to every man and boy in the countryside as Doc.

"The Army veterinarian is a different genus altogether. He is usually as smart in appearance and as well set up as any officer of the line; he is more often than not a university graduate, and

his methods of treatment are as modern and scientific as those of a surgeon or a medical specialist."—Pp. 464-468.

The section goes on to give an extended outline of the work and duties of the Army veterinarian.

W. T. CONWAY, *Inspector-in-Charge*,
New Haven, Conn.

"HONOR TO WHOM HONOR IS DUE"

The following letter will be of interest to many of our readers:

From the Adjutant General of the Army

TO CAPTAIN HORACE B. F. JERVIS,

6 Charles Street, Houlton, Maine.

There is forwarded herewith by registered mail a Meritorious Service Citation Certificate, awarded to you by the Commander-in-Chief, American Expeditionary Forces, for exceptionally meritorious and conspicuous services in Europe.

WM. S. BIDDLE, *Adjutant General*.

The citation was dated May 2, 1920, and signed by John J. Pershing, Commander-in-Chief.

TUBERCULOSIS CONTROL

Research workers in any portion of the field of bovine tuberculosis who have scientific results or control policies bearing directly on control work and which they wish to put before the American Veterinary Medical Association are invited to send as soon as possible a brief, clearly worded statement and argument to the undersigned for consideration by the A. V. M. A. International Committee on Control of Bovine Tuberculosis.

M. H. REYNOLDS, *Chairman*,
University Farm, St. Paul, Minnesota.

NECROLOGY

Dr. Archibald K. Robertson, formerly Chief Inspector of the Bureau of Animal Industry in charge of New York and New Jersey under Commissioner J. M. Rusk, died in Brooklyn on June 7. At the time of the epizootic of contagious pleuro-pneumonia, a disease which threatened to wipe out the dairies of the East and cost millions to the cattle industry, Dr. Robertson was active in the eradication of this peril. He was born in Iowa in 1858 and came to Brooklyn in 1884. He was graduated from the American Veterinary College in 1886.

MISCELLANEOUS

U. S. RETIREMENT LAW AS IT AFFECTS VETERINARIANS

THE Civil Service Retirement Law enacted by Congress and approved by the President May 22, 1920, provides that beginning at the expiration of ninety days following the passage of the Act all employees in the classified Civil Service of the United States who have on that date or shall have on any date thereafter, reached the age of 70 years and rendered at least 15 years of service computed as prescribed, shall be eligible for retirement on an annuity; mechanics, city and rural letter carriers and postal clerks shall be eligible for retirement at 65 years of age, and railway postal clerks at 62 years of age.

The amount of annuity which retired employees shall receive is fixed under six classifications, namely:

Class A—Employees who have served for a total period of 30 years or more, the annuity shall equal 60 per cent of such employee's average annual basic salary for the 10 years next preceding the date in which he or she shall retire. In no event shall an annuity in this class exceed \$720 or be less than \$360 per annum.

Class B—Employees who have served for a total period of 27 years or more, but less than 30 years, the annuity shall equal 54 per cent of such employee's average annual basic salary, but not to exceed \$576 or be less than \$388 per annum.

Class C—Employees who have served for a total period of 24 years or more, but less than 27 years, the annuity shall equal 48 per cent of such employee's average annual basic salary, but not to exceed \$576 or be less than 388 per annum.

Class D—Employees who have served for a total period of 21 years or more, but less than 24 years, the annuity shall equal 42 per cent of such employee's average annual basic salary, but not to exceed \$504 or be less than \$252 per annum.

Class E—Employees who have served for a total period of 18 years or more, but less than 21 years, the annuity shall equal 36 per cent of such employee's average annual basic salary, but not to exceed \$432 or be less than \$216 per annum.

Class F—Employees who have served for a total period of 15 years or more, but less than 18 years, the annuity shall equal 30

per cent of such employee's average annual basic salary, but not to exceed \$360 or be less than \$180 per annum.

Secretary of Interior John Barton Payne, who was selected by the Cabinet members to decide the policy of the Government in the retention of superannuated Government employees under the new retirement law, rendered a decision recently that brought much comfort to the employees who had reached the age of 70 years but had not served for a period of 15 years. His decision recommends that each department head shall decide whether such persons shall be retained in the service or not. This decision was a modification of a previous one to the effect that those who had reached the age of 70 must automatically be separated from the service, thus depriving many well-deserving employees of an annuity because they had not served the full period of 15 years. To follow the strict ruling of the law in this matter and arbitrarily and automatically dismiss these people would be to inflict upon them a grave injustice and to begin the execution of the retirement law in a manner altogether contrary to the plain purpose for which it was enacted.

MONTHLY CONTRIBUTIONS TO BE WITHHELD FROM EMPLOYEES' SALARIES

The Act provides in Section 8 that "beginning on the first day of the third month next following the passage of this Act and monthly thereafter there shall be deducted and withheld from the basic salary, pay or compensation of each employee to whom this Act applies, a sum equal to $2\frac{1}{2}$ per cent of such employee's basic salary, pay or compensation, this fund to be invested by the Secretary of the Treasury in interest-bearing securities of the United States. In case an employee shall become separated from the service before becoming eligible for retirement or an annuity, the total amount of deductions of salary, pay or compensation with accrued interest computed at the rate of 4 per cent per annum compounded on June 30 of each fiscal year, shall upon application be returned to such employee. In case an annuitist shall die without having received in annuities an amount equal to the total amount of deductions from his or her salary, pay or compensation with interest thereon at 4 per cent per annum compounded as herein provided up to the time of his or her death, the excess of said accumulated deductions over the said annuity shall be paid in one sum to his or her legal representatives upon the establishment of a valid claim therefor, and in case an employee shall die without

having reached the retirement age or without having established a valid claim for annuity, the total amount of deductions with accrued interest as herein provided shall be paid to the legal representatives of such employee, provided that if in case of death the amount of deductions to be paid under the provisions of this section does not exceed \$300."

There are many features of the retirement law that are unsatisfactory to most employees, but after many years of endeavor it is the very best law that could be obtained. It is probable that it will be amended from time to time by Congress and to that end employees are now making preparation for the introduction of bills in Congress to modify the plan. It is believed by many that the annuity should be much larger for the employees who contribute the larger annual amounts from their salaries.

Among the Bureau of Animal Industry employees who will be retired on August 21, 1920, are 4 veterinarians, 36 lay inspectors, 3 clerks and 1 laborer.

HONORARY DEGREE FOR DR. RUTHERFORD

The following extract from University of Toronto *Monthly* for June, 1920, is self-explanatory:

"A year ago Dr. John Gunion Rutherford was offered the degree of Doctor of Veterinary Science, but sudden illness prevented him from being present to accept it, and it is a pleasure to have him here now to receive this deferred honor. His varied and outstanding work in public life of the Dominion procured for him in 1910 from His Majesty the title of C. M. G., but in asking you to bestow upon him this degree of Doctor of Veterinary Science, the desire of the senate of the University is to recognize what we deem to be his most important service, that of improving the live stock of the Dominion and probably doing for agriculture, which is the basic industry of our country, what no other man has done to the same extent in this field."

Dr. Hadleigh Marsh, of Helena, Mont., has been appointed by President Cary, Resident Secretary for Montana, to succeed Dr. E. H. Raleigh, who is leaving the State.

Dr. Clark H. Hays, of Indianapolis, Ind., has been placed in charge of the field work of the Bureau of Animal Industry at Lincoln, Nebr., vice Dr. S. E. Cosford, deceased.

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OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

C. A. CARY, President, Auburn, Ala.

N. S. MAYO, Secretary, Chicago

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THE COLUMBUS CONVENTION

ALL of us were glad to have an opportunity to visit the capital of the great Commonwealth of Ohio, long renowned for the wisdom of the statesmen it has sent to Congress and famed as the producer of more presidential timber in late years than any other State in in the Union.

Col. John Y. Bassell, Manager of the Columbus Conventions and Publicity Association, did not exaggerate when he told us at the New Orleans meeting last year that Columbus is a beautiful, prosperous city with ample facilities to meet our needs, that it has grown proficient through experience in entertaining conventions, and that it is her custom to extend splendid courtesy and hospitality to visitors within her gates. There were many things to make us feel that we were welcome in this important educational center with its great State University, the Veterinary Department of which ranks as one of the foremost institutions of its kind. The committee on arrangements deserve great credit and the gratitude of the Association for the careful preparations they made for our comfort and entertainment. It was a great advantage to have the use of such a centrally located and conveniently arranged building as Memorial Hall for a meeting place.

The program covered a wide scope and was exceptionally interesting. A notable feature was the appearance of so many new names, which is only one of the indications of the care and wisdom exercised in its preparation.

Meetings of committees began on Sunday, August 22. The Executive Board held several sessions in advance of the scheduled time for meeting, so that there would be no unnecessary delay at the general sessions in dispatching the business to be brought before the Association. Everywhere there were signs of preparation. Thus the Fifty-seventh Annual Meeting of the A. V. M. A. met in Columbus under the most auspicious conditions and the indications for a successful meeting were evident from the start. Approximately 500 members and 550 visitors, including ladies, were present, making one of the largest assemblages at any meeting of the Association.

Monday morning at 9:30 the members of the Association, their wives and friends, began to gather for the opening session, which was preceded by pipe-organ selections and community singing under the direction of Karl Hoenig.

President C. A. Cary called the meeting to order promptly at 10 o'clock. After the invocation by the Rev. Dr. Hargroves of Columbus the announcement was made that it would be impossible for the Mayor to be present and that Col. Bassell had suddenly been taken ill. The address of welcome was delivered by Mr. Hugo Schlesinger, Prosecuting Attorney for Franklin County, who ably represented the Mayor and Col. Bassell and was responded to in a pleasing address by Dr. George H. Glover. The President's address, which followed, was constructive and contains much material for careful thought. It appears in full in this number of the JOURNAL.

The afternoon session was devoted principally to hearing reports of officers and committees. In accepting the report of the subcommittee of the Executive Board the By-Laws were changed so that hereafter the Secretary of the Association and the Editor and Business Manager of the JOURNAL will be selected by the Executive Board and these positions may be held by one person. According to the Secretary's report, approximately 300 applications for membership have been filed and 15 members have been lost by death.

Dr. W. Horace Hoskins, chairman of the Committee on Legislation, gave an interesting review of the past work of that committee. He also called attention to the inadequate compensation of the large body of Bureau of Animal Industry veterinarians. In retiring from the committee he called attention in an impressive manner to the

important work that remains for future committees on legislation.

The President's reception Monday evening was among the most enjoyable occasions of the kind in the history of the organization. It was largely attended, and the spacious ball-room in the Deshler Hotel afforded splendid facilities for dancing and general sociability.

The convention got into full swing on Tuesday morning. The literary program was divided into three sections: General Practice, Sanitary Science and Police, and Faculties and Examining Boards. The attendance in each section was very good. The papers read were of a high order and showed much care and work in their preparation. Interest seemed to center especially around the papers and discussions on the subject of tuberculosis in connection with the accredited-herd work that is being conducted by the Bureau of Animal Industry in coöperation with the various States. The paper of Dr. L. A. Merillat on "The Veterinary Professions of the United States and France Compared" attracted special attention on account of the comparison which was not entirely favorable to the United States. Some of the papers were well illustrated by original stereopticon views.

The only nominees for President for the ensuing year were David S. White and A. H. Baker. Four hundred and forty-eight votes were cast, of which Dr. White received 325. The vice-presidential election resulted as follows: First Vice-President, A. O. Longley; Second Vice-President, A. A. Etienne; Third Vice-President, John H. Gould; Fourth Vice-President, T. A. Burnett; Fifth Vice-President, J. J. Cranwell. M. Jacob was unanimously reëlected Treasurer.

Colorado Springs, Colo., was selected as the place for the next annual meeting, after a careful consideration of the invitations received from various other cities.

President Cary in his address urged that steps be taken to provide the Association with a permanent home. This idea appealed to the members of the Association, and it was decided by vote that the Executive Board should proceed to make inquiries relative to location and cost of suitable buildings for the purpose and be prepared to report at the next annual meeting.

The alumni meetings were held on Tuesday evening. A special performance of an elaborate pageant was given at the Coliseum Wednesday for the entertainment of the members and their friends. This was a most agreeable surprise and was well worth the trip to Columbus. The banquet Thursday evening was most enjoyable.

Instead of following the usual course in such affairs, professional entertainers were provided.

On the whole, the meeting at Columbus was a great success in every respect. The weather was ideal, the program was instructive, and the entertainment provided was decidedly more than we anticipated. We shall always remember with pleasure the Columbus Convention.

RELATION OF VETERINARIAN AND FARMER TO DISEASES OF LIVE STOCK

THE numerous deaths from anthelmintics improperly administered naturally lead to the conclusion that the administration of such drugs as anthelmintics is properly the field of the veterinarian and not of the farmer and stockman. In actual practice, the farmer and stockman desire treatments that they can administer themselves, including those for removing worms, and some men habitually do their own veterinary work along certain lines. In the endeavor to preserve the balance of income and expenses, it is only natural that more or less of this should be done. However, the not infrequent losses which result from this practice warrant a consideration of its advisability in a given case. So far as anthelmintics are concerned, we are dealing with potent drugs, and it is necessary, in order to avoid losses, that one know the nature of the drugs, the dosage, the anatomy of the animals to be treated, and the conditions which make it dangerous or inadvisable to administer anthelmintic treatment in any given cases. Ignorance along these lines—and farmers and stockmen are not usually informed along these lines—may mean serious loss, and regrets are of little avail when a herd has been killed by ignorance of such anatomical details as the median pharyngeal recess in swine, or of exact dosage, or of the conditions which may cause an otherwise beneficial anthelmintic to kill the animal treated.

The prevention of worm infestations in stock is more important and more profitable to stockmen than is treatment for existing infestations. Parasitism causes animals to be unthrifty. They are set back in their growth and development. Anthelmintics may free animals from their parasites and permit them to regain their health, but if they have carried their parasites through the growing period of youth, the golden opportunity for full development and growth is lost, and the anthelmintic treatment itself is, to a certain extent, a shock from which the animals must recover. Moreover, the fact that we have no satisfactory treatment at present for such worms as

nodular worm and whipworm is another reason for emphasizing preventive measures.

Prevention of parasites is largely a problem in cleanliness and especially in manure disposal. It is safe to assume that manure always contains worm eggs and is always dangerous. It is least dangerous when fresh, before the worm eggs have a chance to develop to the infective stage or reach the necessary intermediate host that will convey them back to live stock. Therefore, the prompt removal of manure and its disposal in places where it is least apt to get its worm content back to stock is a measure of great value. Spreading it where it will dry quickly or plowing it under are good methods of disposal. Since swine have almost no parasites of importance in common with cattle and sheep, it is safe to put swine manure on pasture where cattle and sheep are pastured, and vice versa, and horses may be alternated with swine or with cattle and sheep. Pasture rotation removes animals from the manure on pasture and thus aids in avoiding infection. Persistent use of the same pasture concentrates the infection; in other words, *permanent pastures perpetuate parasites.*

M. C. H.

THE TRACTOR AND THE HORSE

THE impression that the use of the tractor will eliminate a large percentage of the horses kept on the farm has not been borne out by a study of the subject by the Office of Farm Management of the United States Department of Agriculture, the results of which have recently been published as Farmers' Bulletin 1093. The inquiry covered a full year's work on 191 farms in seven States in the Corn Belt. It was found that while the use of the tractor brought about a reduction of about one-fourth in the number of horses kept on the farms, the remaining horses continued to perform three-fourths of the tractive work. In other words, the tractor may cause a slight reduction in the number of horses needed for farm work, but the horse still remains indispensable for most of the work. The chief value of the tractor lies in its ability to do heavy work, especially plowing in hard soil, and to cover the desired acreage in a shorter time than the same work can be done by horses. The best results seem to come from the combined use of both horse and tractor, each doing the work that it can do to best advantage and each supplementing the other.

The purchaser of a tractor is advised to keep enough horses to cultivate corn and do other necessary work which must be done at the same time, but which the tractor cannot do.

PRESIDENTIAL ADDRESS¹

By C. A. CARY, Auburn, Ala.

NOVELTY and newness (new things, unexpected and unknown things) attract attention, excite interest and are quickly carried to the world public. The public wants exciting, thrilling news, and the daily papers supply the demand. The medical man is not unlike the average man. He has a keen outlook for new things, discoveries, and too many times he is not sufficiently conversant with the well-established facts that would make him more efficient in his profession. It is not my purpose to say that our Association shall be so conservative that it can not grow, or shall be so progressive and radical that it may grow rapidly and then rapidly decay. Unhealthy growth spells decay. Too much conservatism prevents growth.

LIMITATIONS OF THE PRESIDENCY

Some of our members seem to think that the President of the A. V. M. A. has unlimited powers. His official time is short, and his preparation, experience, and knowledge of the workings of the Association are very limited. Sometimes he can not get definite and positive facts about questioned subjects before his term of office expires. His powers are largely suggestive and appointive rather than constructive. And I suspect that the limited executive powers of the President are for the good of the Association. As a rule hasty changes, revolutionary or radical in effect, should not be made. Hence the value of suggestive, constructive changes, which give time for the members of the Association to measure and consider before adopting them. In suggesting I do not wish to assume the place of a prophet, or to be too arbitrary, or overreach the conditions and facts. I have at heart the good of the profession and the welfare and advancement of this great Association.

Observe and consider here that it would be a great help to the President and all officials of the Association if a copy of the business proceedings of each meeting were printed and placed in the hands of each officer and member very soon after the meeting. I have been unable to act promptly and have made some errors because I did not have such a copy.

We have five Vice-Presidents, and they have no definite work to

¹ Delivered at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August 23, 1920.

do. It seems to be unjust to them to give them honor without work. I do not think they love mere ornamentation. Why not make these officers mean something? If possible make them into a committee, or require them to give five- or ten-minute written annual reports



DR. C. A. CARY

on their respective districts, and elect these men to represent their respective districts.

REPRESENTATION IN OTHER BODIES

Our relation to the decennial convention that revises the United States Pharmacopœia is one that should be considered and some

action taken at this meeting. As suggested by Dr. Mohler, a Special Committee on Pharmacopœia should at once be created. This committee should at once prepare a list of drugs to be recommended to the Committee on Revision for induction into the Pharmacopœia. Arrangement also should be made by this special committee for the admission of the American Veterinary Medical Association to membership in the decennial convention on the revision of the United States Pharmacopœia.

No funds were available for a membership or a delegate to the National Research Council of the National Academy of Science. The affiliation can be secured if funds are made available to pay the expenses of a representative of this Association to that convention.

THE NEW ARMY VETERINARY LAW

A few words about the new Army veterinarian may not be out of place. There are defects and good things in the new veterinary law. According to Officer John H. Gould, the most valuable feature of the new law on the Veterinary Corps is the acquisition of rank up to and including colonel. There may be many other good things come out of this new law that time and its application will bring out. While we have a very efficient and capable chief in Colonel Morse, who is now acting head of the Veterinary Corps, we can not and should not forget that our interest would be handled to our greater satisfaction, and, I trust, with equal and possibly better efficiency, with a veterinarian at the head of the Corps. It may take time to make the new Veterinary Corps function at its best under the new law, and by the time the new machinery gets to running we can secure another or many other advances that make for better efficiency, and then the standard may be raised. It is not my purpose to enumerate and discuss the defects in the new law. They will come out as it is put into action. And the Army veterinarians should keep our Committee on Legislation informed so that we can secure legislative improvements. I do not think it would at all be wise for personal bickerings or fights about petty or big promotions to become the foundation of our work for better and improved legislation. Such things have held us back and down in times past. Sink personal prejudices and selfishness and see the good that may come to the future Army veterinarian and the profession in a higher standard, a more equitable or favorable (as to time and service) system for promotions, more officers (active and reserve) and all

other things commensurate with the requirements of a modern and growing army.

THE EDUCATIONAL PROBLEM

Lest I be found wanting, let me touch the great question of veterinary education. Someone has said that human medicine is made up of "facts, statistics, theories, speculations, probabilities and even possibilities," and that the student at best can take only a very small, carefully prepared, digestible, or even a predigested, portion of this great mass of knowledge and theory. Would it not be wise and simplify our teaching if the best qualified men in our profession were to sift and select the facts and the best theories in veterinary medicine and then advise our teachers and institutions to teach and demonstrate to the student that which we know, and not waste so much time on hypotheses, speculations, probabilities and even possibilities that never were half baked but become factors of confusion in the minds of the student? What a field for work! Why should book writers compile works on medicine when so little of the contents are known from the experience of the writer and he possesses no means of verifying them?

The United States Civil Service Commission has recently ruled that the entrance requirements of all accredited veterinary colleges shall be not less than fourteen high-school units and the course shall cover four years in length. Hereafter all recognized colleges must equal that standard or their graduates can not stand civil-service examinations for Federal appointments. There does not appear any reason for decreasing or going backward in entrance requirements. If anyone should be so unwise as to advocate easier requirements, let him recall where the veterinary graduate stood when the tests were made of professional men in the United States Army.

A selected committee of highly qualified, disinterested men can visit every veterinary college on this western hemisphere and find a few good and efficient teachers in each and every school. However, there are inefficient teachers and instructors. Some teachers may know facts but can not lead or get the student to grasp them, or develop mental ability, activity or skill or art. Some teachers waste time in trying to make students learn and believe possibilities. For example, some teachers stuff the student with too many unimportant, useless facts. Too much of a student's time is wasted in trying to make him memorize unimportant details in anatomy. I hope to see the time when anatomy will be taught only in the dissecting room and be confined, for the undergraduate, to gross anatomy, and

let the detail anatomy be given to students and post-graduates who study special anatomy for specialty practice. Quit wasting the time and mental energy of the student on the long-drawn-out anatomy of the solipeds, and give more general dissecting-room anatomy of the ox, sheep, hog, dog, cat and poultry.

Again, there are too many teachers who are in colleges because of lack of money on the part of the college to get better teachers. In some instances very good teachers for some subjects are not available. Can this be changed? Not now. When the colleges get more money and the teachers stop wasting the time of the students on the excess of nonessentials and confine their instructing and laboratory demonstrations to the fundamental and plain facts, will there be developed teachers, students and veterinarians who may grow into any specialty by study, practice and post-graduate work.

Let the laboratory teachers stop trying to empty all the questionable things into a student's head and expect him to analyze and retain and use them. Take modern bacteriology. The student is required to remember a multitude of details about a great number of germs, some of which are so uncertain and vague that the expert bacteriologists fight and disagree about their cultural and biological characters. Why not confine the teaching of such a subject to the best-known pathogenic bacteria, and leave all the rest for the man who can and will get it if he becomes a specialist? To be brief, too many teachers (didactic and laboratory teachers) believe that the whole knowledge of medicine is confined to his special subject, and then proceed to cram it all into the student, without ever stopping to consider that the general medical student must acquire some knowledge of other subjects.

Want of properly conducted clinics is a defect in some veterinary colleges. Too many of the teachers have had no field experience, and they develop a peculiar, narrow method of college or highly scientific clinics and are so exact that the student never meets the same conditions in actual practice of any kind when he leaves the college walls.

If there be one phase or feature of domestic animal life that the veterinarian should know in its fullness it is animal husbandry. How few veterinary schools give a reasonably full course in animal husbandry! The veterinarian must know how to judge feed and breed and to handle all kinds of farm animals. To do this he must have practice in handling and judging and feeding. He must know

much about the dairy industry, sheep husbandry, swine and poultry breeding, and feeding and marketing.

In order to maintain and advance the standard of veterinary medical education in America the college must have:

(1) High entrance requirements, based not only on general educational credits, but also on credits founded on practical experience, educational and other allied work.

(2) Better teachers must be obtained, more all-time teachers who know by instruction and experience and can do real teaching.

(3) The laboratory work in the college must be more definite and confined to what are the facts and not waste so much time on theory and speculation.

(4) The college should be located where ample space for buildings, yards and fields may be obtained and where sufficient cattle, horses, mules, sheep, swine, poultry, dogs and cats for clinical dissection and other laboratory uses may be obtained.

(5) Buildings should be constructed and arranged upon the unit system, so that the chief departments will have separate buildings, yards, etc. Each building (with very few exceptions) should have only one story. One or two sky-scrapers with all departments crowded into them should be avoided.

(6) The undergraduate course of study should be arranged for average men who have necessary entrance requirements, and not for post-graduates or specialists.

(7) Post-graduate courses may be given to produce specialists in surgery, physiology, pathology, bacteriology, hygiene, parasitology, special animal practice, research work, specialists in municipal, State and Federal sanitary science and police, in meat and milk inspection, in animal husbandry, in dairy practice and in teaching.

(8) In no case should the undergraduate instruction or course attempt to make specialists of all kinds, as has been done in the past. The chief aim should be to give general fundamental medicine to produce or develop practitioners and men who are ready to take up a specialty.

(9) Better field and hospital work should be supplied in all colleges, and, if possible, vacation periods should be spent in hospitals or in practice.

(10) It is possible that the entire year should be occupied in some line of educational work. What is now given over (three or four months) to rest and vacation could be spent in practice, in

hospitals or in actual college work at some college where summer work is given.

(11) Less time should be wasted on football, other games, holidays and numerous idle periods. If exercise and development are required, let them be in the form of constructive work in gymnasiums, military drill, etc.

REACHING THE PRACTITIONERS

This Association has a membership of nearly 5,000 veterinarians. The members are largely in the United States and Canada. The greater number are practitioners, yet I judge that not more than 25 per cent of the practitioners are members of our Association. Why this condition? It appears to be due to many factors and conditions. What concerns us is, Wherein is the Association wanting? Is the Association reaching the man in practice? In a great measure it is developing and benefiting many men in practice. But is there not some way by which this Association could get into closer touch with men in practice? The Association must realize that less than 50 per cent of its members can attend its annual meetings; and, up to date, rarely do 25 per cent of its members attend annual meetings. No organization can hold and influence and benefit or build up its membership of practitioners without giving these field men something to do, some power or influence in the organization. This is not a new idea; it is as old as civilization. Governments are harking back toward pure and simple democracy in which every individual may have some power in government. Our Republic is now about to take on universal suffrage. Kings and emperors are giving way to the rule of the people.

Our Constitution and By-Laws should be amended in some way so that every member in good standing may vote on all important subjects and in the election of all important officers. This matter was considered by the Committee on Revision of the Constitution and By-Laws, and the present adopted Constitution and By-Laws provide that home members may vote to elect members of the Executive Board and on certain referendum subjects. But this does not reach the point of attraction or interest. The Secretary's records will show that too many members are sliding back and out for lack of interest and for non-payment of dues. Obviously there are factors that account for this backsliding or cutting loose from the Association. Would it not be well to have a special committee appointed to make a survey and see if some remedy or changes in

our Constitution and By-Laws can be made to meet the wants of the home veterinarians who need our help?

SECRETARY, EDITOR AND HEADQUARTERS

The Secretary is the main working man of this Association. He does more, controls more actions and functions than the President, and justly and rightly so. He comes close to being the heart of the Association. In order to know he must have experience and common sense, executive, clerical and emergency ability. That he may best work and best function, he should have a long term of office and be selected for his good natural sense, executive ability and honesty. To have a good Association it is self-evident that an efficient Secretary must be had. We are not doing what we could because our present arrangements do not call for an all-time Secretary. Now in order to do that it may be necessary to do the next best thing. As Dr. Mayo suggested at Philadelphia, combine the editorship of the official JOURNAL with the secretaryship, and give him sufficient help and let him do both. The duties of Secretary and Editor are closely associated, and the same type of man is essential for both lines of work. If funds permit, it would be still better to have an all-time Secretary and an all-time Editor, and, when possible, departmental editors.

That is not all that may be done to make the Secretary and Editor more helpful and efficient. In addition to an all-time Secretary and Editor, we need an all-time home for this double head and heart of the organization. This home need not be in a big city or at a college. It should be in a small town or city centrally (geographically) located. Why there? Because it would cost less to buy a suitable, commodious, healthy place, house or houses and grounds, and would be away from untoward local influences. In it there should be educational rooms, filing and other rooms for the Secretary and his clerks, and, if necessary, space and rooms for a printing plant. We are ready for the all-time Editor and Secretary and the all-time home. Let us get together and get them, lest we forget our duty and waste more time with an inefficient system that permits us to drift. Look at the good work of the American Medical Association.

Our frequent and sudden changes of Secretary and Editor have given us no stability or definiteness of purpose, and such changes have been financially expensive. For the good of the Association we are sadly in need of a fixed, permanent home. Let us make one and keep it and develop it.

THE PRODUCTION AND EXPERIMENTAL USE OF BOTULINUS ANTITOXIN, TYPES "A" AND "B"

By G. H. HART, and F. M. HAYES,
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IN the winter of 1918 and 1919, forage poisoning of horses was unusually prevalent in California. One outbreak occurred on a purebred stud farm, and in a period of about three weeks 13 valuable horses died, entailing a financial loss of several thousand dollars. A very heavy rain, varying from 3 to 6 inches in different parts of the State, had occurred in September. This was followed by warm weather and the winter continued mild throughout. A great deal of hay was wet in the field by the rain, some being in stacks, but also much that had been baled and piled without being under cover. This became moldy and more or less spoiled. It is true that in all of the outbreaks visibly spoiled feed was not demonstrable, but nevertheless the above described weather and feed conditions are those in which we expect forage poisoning to become prevalent.

The work of Buckley and Shippen (1) and Graham, Brueckner and Pontius (2) had shown the close similarity of this disease to that produced by toxin of *Bacillus botulinus*, first isolated by Van Ermengem (3, 4) from ham, the consumption of which had caused human deaths in Ellezelles, Belgium. Botulinus antitoxin had been produced by Graham, after the method used by European investigators, and when injected into horses was found to have marked protective value against a subsequent injection of botulinus toxin. A limited supply of this antitoxin was obtained from the University of Illinois and tried as a therapeutic agent in several cases of the disease in horses by ourselves and also by Dr. L. M. Hurt in the southern part of the State, without beneficial results.

Dickson and Burke (5, 6, 7, 8, 9, 10), of Stanford University, had done some very extensive and elucidating work on botulism in the human family and the bacteriology of *B. botulinus*. In their study of cultures of the organism from various sources they found, as had previously been done by J. Leuchs (11), that at least two types of the organism were present, which could only be differentiated by toxin-antitoxin tests. These they classed as "A" and "B," respectively, while Leuchs, in his work in 1912, had differentiated the strains with which he was working under the letters "E" and "D."

These letters were probably used by Leuchs because his "E" culture was the Ellezelles organism isolated from ham by Van Ermengem and his "D" culture was the Darmstadt organism isolated by Von Gaffky from bean salad.

Kemper (12) was the first man to produce botulinus antoxin. On small animals he was not so successful, but later he succeeded in immunizing two goats out of three so that their serum had antitoxic properties. Leuchs first produced the antitoxin in quantity, using horses and immunizing them separately against the two strains of the organism. He showed by experimentation on small animals that antitoxin produced from his "E" strain of *B. botulinus* had practically no protective qualities against toxin produced from his "D" strain of the organism, and vice versa. Dickson and Burke confirmed this work with their "A" and "B" strains.

In testing the Graham antitoxin against these two strains of the organism, Burke found that it had been produced with the "B" strain and therefore would have protective value only against toxin produced from this type of the organism. From the work of Dickson and Burke on strains of *B. botulinus* from various parts of California, it was evident that the "A" type of the organism was much more prevalent in this State.

In an outbreak of forage poisoning in horses at Oakdale, Calif., where the Graham antitoxin had been used with no beneficial results, Burke isolated *B. botulinus*, "A" type, from the hay which the affected horses had been eating and which was considered to be the feed causing the disease.

It therefore became evident that, if any experimental trials of the therapeutic and preventive value of botulinus antitoxin in forage poisoning in horses were to be made, the development of a supply of antitoxin of both strains was essential. Therefore, in April, 1919, two horses were started to be immunized against the toxin and were designated type "A" horse and type "B" horse, respectively.

PREPARATION OF ANTITOXIN

In carrying on this work the dosage used in the immunization work previously carried on by the United States Bureau of Animal Industry and obtained from J. S. Buckley, Chief of the Pathological Division, was followed.

In this article the letters m.l.d. are used to indicate the minimum lethal dose of toxin that will kill a guinea pig weighing between 250 and 300 grams, in 48 hours, when injected subcutaneously.

The organisms were grown in deep tubes or special culture bottles in 2 per cent glucose beef broth, made 2 per cent alkaline before sterilization (hydrogen concentration after sterilization, 8.4), and incubated at 26 degrees F. for 21 days, the time and temperature which the work of Dickson and Burke had shown to develop the toxin best. At the end of the incubation period the broth was filtered through Berkfeld filters.

The type "A" culture used in this work was one that produced about 450 m.l.d. per mil. The type "B" culture was very much weaker in toxin-producing ability and averaged about 40 m.l.d. per mil.

As the same culture of either strain of the organism does not always produce the same strength toxin under favorable conditions, it is, of course, necessary to test each new batch on guinea pigs in order to ascertain the potency. The toxin undergoes oxidation when exposed to the air and becomes weaker. When kept in well-filled and sealed bottles or under an oil float in the ice box, its reduction in toxicity is very gradual and it can be kept for several months at least. It must, however, be tested on guinea pigs from time to time to ascertain its degree of lowered toxicity.

The first two antitoxin horses, type "A" and type "B," respectively, were injected subcutaneously, beginning April 21, 1919, and continuing as shown in the accompanying table.

During the hypering period, several tests were made to determine whether the serum in 1 c.c. quantity would protect a guinea pig against the last amount of toxin injected into the horses. The first one was made July 3, 1919, from blood drawn June 30, 1919, the horses having 10 days previously, on June 20, received a subcutaneous injection of 25 3-5 m.l.d. Two guinea pigs were used with each type, one receiving 1 c.c. of serum and 25 m.l.d. of toxin and the other 1 c.c. of serum and 10 m.l.d. of toxin. The toxin and serum were mixed *in vitro* and injected immediately.

In the case of the "A" horse serum, both pigs were apparently normal at the end of 24 hours, but rapidly went down after that time, and both were dead at the end of 48 hours.

The pigs used to test the "B" horse serum remained normal and after several weeks were discarded. Up to this point, therefore, the "B" horse was producing a more potent serum than the "A" horse.

The second test was made September 16, 1919, with serum drawn September 14, 8 days after 200 m.l.d. of toxin had been administered. In this case only one guinea pig was used with each type.

Table showing doses and time between injections in hyper-immunizing horses to botulinus toxin

TYPE "A" HORSE					TYPE "B" HORSE		
Injection		Received m. l. d.	Toxin	Series *	Received m. l. d.	Toxin	Series
No.	Date						
	1919						
1	April 21	1/20	A	1	1/20	B	1
2	" 26	1/10	A	1	1/10	B	1
3	May 2	1/5	A	1	1/5	B	1
4	" 6	2/5	A	1	2/5	B	1
5	" 14	4/5	A	1	4/5	B	1
6	" 21	1-3/5	A	1	1-3/5	B	1
7	" 29	3-1/5	A	1	3-1/5	B	1
8	June 6	6-2/5	A	1	6-2/5	B	1
9	" 12	12-4/5	A	1	12-4/5	B	1
10	" 20	25-3/5	A	1	25-3/5	B	1
11	" 30	50	A	1	50	B	1
12	July 5	100	A	1	100	B	1
13	" 18	200	A	1	200	B	3
14	Aug. 1	450	A	1	450	B	3
15	" 12	1,000	A	1	1,000	B	3
16	" 26	100	A	1	100	B	3
17	Sept. 6	200	A	1	200	B	3
18	" 18	400	A	3	400	B	3
19	" 25	800	A	3	800	B	3
20	Oct. 3	1,600	A	3	1,600	B	3
21	" 15	3,200	A	3	3,200	B	4

Both horses bled first time October 25, 1919.

22	Nov. 10	1,600	A	3	1,600	B	4
23	" 18	3,200	A	4	3,200	B	5
24	" 30	4,800	A	4	4,800	B	6

Both horses bled second time December 12, 1919.

Both horses bled third time December 15, 1919.

25	Dec. 30	2,400	A	5	2,400	B	6
26	1920 Jan. 7	4,800	A	5	4,800	B	6

"A" horse died 8 days after this injection.

27	Jan. 19				5,900	B	7
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"B" horse bled fourth time January 31, 1920.

"B" horse bled fifth time February 4, 1920.

One cubic centimeter of serum from each horse was mixed in vitro with 133 m.l.d. of the respective toxin and injected immediately. The "A" type pig remained normal for several days, but gradually became paralyzed and died the night of September 24, 8 days after inoculation. The "B" type pig remained normal until discarded after 6 weeks.

On October 15, 1919, the horses were given a subcutaneous injection of 3,200 m.l.d. of the respective types "A" and "B," and 10 days following this injection were bled, as we were anxious to get some antitoxin for experimental purposes. The serum from this bleeding was collected, filtered through Berkfeld filters and bottled after carbolizing a portion of it.

One cubic centimeter of the "A" type serum was found on testing to be sufficiently potent to protect a guinea pig completely against 500 m.l.d. of "A" type toxin, and the same amount of "B" type serum to protect a guinea pig against 1,000 m.l.d. of "B" type toxin. It was felt that while a much higher potency serum was desired, this was sufficient to carry out some experimental work while larger doses of toxin were being administered to the horses.

One cross test of the "A" and "B" types of antitoxin was made on November 28, 1919. Two hundred m.l.d. of type "A" toxin, mixed in vitro with 1 c.c. of type "B" serum and injected, killed the guinea pig in 12 hours, although this serum completely protected a guinea pig against at least 1,000 m.l.d. of type "B" toxin mixed and injected in the same manner.

On November 30, 1919, both horses received 4,800 m.l.d. of the respective toxins, and both were bled the second time on December 12, 1919, followed by a third bleeding on December 15, 1919. Serum from these bleedings of the "A" type horse was much more potent, and 1 c.c. of it added to 3,500 m.l.d. of toxin in vitro and injected immediately rendered it harmless to guinea pigs.

The second injection following this third bleeding caused the "A" horse to break with symptoms identical to those of forage poisoning on the eighth day following the injection. In spite of the intravenous administration of 100 c.c. of its own antitoxin on the eighth day and 225 c.c. additional on the ninth day, it continued to get steadily worse and was dead on the morning of January 19, 1920, 12 days after the injection. The toxin used in the last two injections on this horse was a new batch, series 5, of the same culture. With previous batches $\frac{1}{4}$ to $\frac{1}{8}$ c.c. of a dilution consisting of 1 part of toxin to 36.5 parts of distilled water had constituted 1

m.l.d. In testing this batch on December 24, 1919, the guinea pig receiving $\frac{1}{4}$ c.c. was dead in 20 hours, and the one receiving $\frac{1}{8}$ c.c. was dead in 30 hours. Without testing on more guinea pigs, 1-12 c.c. was estimated to be 1 m.l.d. After the horse died, another test was made of the toxin, and 1-16 c.c. of the same dilution, 1 to 36.5, proved to be 1 m.l.d. The toxin, therefore, contained 584 instead of 438 m.l.d. per cubic centimeter. Consequently on the twenty-fifth injection the horse received 3,212 instead of 2,400 m.l.d., and on the twenty-sixth injection 6,424 instead of 4,800 m.l.d., which was the cause of its death.

The "B" horse was given a final dose of 5,900 m.l.d. of toxin on January 19 and bled the fourth time on January 31 and the fifth time on February 4, 1920.

We now had on hand a number of liters of a fairly potent antitoxin of both types, "A" and "B," and with this material the following experimental work was carried on.

EXPERIMENTAL WORK

The object of the experimental work was primarily to ascertain whether botulinus antitoxin had any therapeutic value against the symptom complex produced by the administration of botulinus toxin or in natural outbreaks of forage poisoning. The work of Graham on horses and Dickson on experimental laboratory animals, together with that of Van Ermengem, Kempner and Leuchs, had definitely shown its prophylactic value, but if completely lacking in therapeutic effect its field of usefulness would be greatly curtailed.

Experiments on Chickens

In order to ascertain the fatal dose for a chicken, hen No. 1 was given 103 m.l.d. of type "A" toxin subcutaneously. Two days later she showed typical symptoms of limberneck and died on the third day, about 70 hours after the injection.

Chicken No. 2, a cockerel, and No. 3, a pullet, were given 50 m.l.d and 200 m.l.d., respectively, of type "A" toxin, by the mouth in feed, without producing any symptoms of limberneck.

This indicated that a chicken is somewhat more resistant to the toxin than a guinea pig in proportion to body weight when injected subcutaneously, and also that a considerably larger dose of toxin is necessary to kill a chicken by the mouth than when injected under the skin.

On December 22, 1919, at 9 a.m., cockerels Nos. 4, 5, 6, 7 and 8

were each given 80 m.l.d. of type "B" toxin subcutaneously. At 1 p.m. No. 4 was given 3 c.c. of type "B" serum subcutaneously. At 5 p.m. No. 5 was given 3 c.c. of type "B" serum subcutaneously. At 9 a.m., December 23, No. 6 was given 3 c.c. of type "B" serum subcutaneously. At 9 a.m., December 24, No. 7 was given 3 c.c. of type "B" serum subcutaneously. No. 8 was left untreated.

On December 26 the untreated chicken showed a drooping of the head and cyanosis of the comb. Through December 27 and 28 it continued to show typical symptoms of limberneck. In the following days it gradually improved and finally made a complete recovery. As late as January, 1920, however, although apparently normal on observation, it showed early fatigue on excitement and exercise. The four chickens receiving the serum following the toxin at intervals of 4 to 48 hours failed to show anything abnormal.

This experiment tended to show the protective value of the serum in chickens when given following the administration of toxin but before the appearance of symptoms.

On January 19, cockerel No. 4, from the foregoing experiment, was given 120 m.l.d. of type "B" toxin subcutaneously, and remained normal. On January 26, No. 5 was given 240 m.l.d. and remained normal. No. 6 became affected with an intercurrent disease being studied by other members of the staff, and was discarded. On January 29, No. 7 was given 500 m.l.d. of type "B" toxin. This cockerel showed some evidence of limberneck from February 3 to 9, but made a complete recovery.

These experiments tended to show that the previous administration of toxin and antitoxin had conferred some immunity, but as the action of type "B" on fowls is somewhat variable, too much dependence can not be placed upon it.

On January 31 five additional fowls, Nos. 9, 10, 11, 12 and 13, were each given 400 m.l.d. of botulinus toxin, type "B," subcutaneously, at 9 a. m. At 1 p. m. No. 9 was given 5 c.c. of type "B" serum, subcutaneously. At 5 p. m. No. 10 was given 5 c.c. of type "B" serum, subcutaneously. At 9 a. m., February 1, No. 11 was given 5 c.c. of type "B" serum, subcutaneously. At 9 a. m., February 2, No. 12 was given 5 c.c. of type "B" serum, subcutaneously. No. 13 was left untreated.

On February 5 Nos. 12 and 13 were affected and showed weakness, sitting on the floor of the cage instead of on the perch. Their heads, however, were not drooping. No. 12 recovered after a few days, but No. 13 remained affected and developed a drooping of

the head. It suddenly broke with the intercurrent disease mentioned above and died on February 15.

This experiment tended to show the variability of the action of "B" type toxin on chickens, as the much larger dose of toxin should have killed the untreated chicken before 15 days had elapsed. It also indicated that the larger the dose of toxin the earlier antitoxin must be given to produce complete protection, as evidenced by fowl No. 12, which did not receive antitoxin for 48 hours, becoming affected.

Another culture of type "B" of high toxin-producing ability was later obtained, to which chickens were very refractory. Broth cultures of this organism, incubated 21 days and filtered, showed 1,500 m.l.d. of toxin per cubic centimeter in the filtrate. Cockerel No. 20 was given 1,500 m.l.d. of this toxin by the mouth; cockerel No. 21 was given 4,500 m.l.d. of this toxin by the mouth; cockerel No. 22 was given 1,500 m.l.d. of this toxin subcutaneously; cockerel No. 23 was given 15,000 m.l.d. of this toxin subcutaneously. All of these cockerels remained normal except No. 23, which developed a typical case of limberneck and died in about 60 hours after the injection.

On February 19, at 4:45 p. m., cockerels Nos. 4, 5 and 8, previously mentioned in type "B" toxin experiments, were each given subcutaneously 400 m.l.d. of type "A" toxin. The following morning all three fowls were badly affected with limberneck, being hardly able to stand and heads drooping to the ground. At 11 a. m. No. 8 was given 15 c.c. of type "A" antitoxin subcutaneously, and No. 5 was given the same dose intravenously, while No. 4 was left untreated. During the day all three became weaker, Nos. 4 and 5 being worse than No. 8. The following day Nos. 4 and 5 were dead and No. 8 was unable to stand. At 3 p. m. it received 15 c.c. more of "A" type antitoxin subcutaneously. The fowl lived through the day but was dead on the morning of February 23. From the beginning the disease had gradually progressed to a fatal termination in this fowl, and it is doubted whether the serum really prolonged its life. The experiment indicated that chickens are definitely more susceptible to type "A" than to type "B" toxin.

On March 15 cockerels Nos. 7 and 11, previously used with "B" toxin experiments, were each given, per mouth, 3.5 c.c. type "A" toxin, series 5, the same which had proved fatal to chickens 4, 5 and 8 in 1 c.c. doses (400 m.l.d.) subcutaneously. These cockerels remained unaffected.

On March 17 cockerels 14, 15, 16, 17 and 18 were placed in an

experiment to ascertain the dose of "A" toxin by the mouth that would be fatal. No. 14 was given 2 c.c.; No. 15, 4 c.c.; No. 16, 6 c.c.; No. 17, 8 c.c.; and No. 18, 10 c.c., of type "A" toxin, containing 584 m.l.d. per cubic centimeter. The material was placed in the esophagus of the fowls with a glass pipette.

No. 18 was badly affected on March 18 and was dead on the morning of the 19th. Nos. 16 and 17 both showed typical symptoms on the 19th, but lived for several days, No. 17 being found dead on the morning of March 22 at 8:30 a. m., and No. 16 on March 23. No. 15 was slightly affected on March 19, and the disease steadily progressed, the chicken being found dead on the morning of March 22. No. 14 showed symptoms on the 19th, and during the 20th, 21st, 22d and 23d they progressed until the chicken, to all appearance, was moribund. Improvement was noticed, however, on the 24th, and continued rapidly so that the chicken was able to stand on the 25th and gradually made a complete recovery.

On March 31, 1920, cockerel No. 19 received 3 c.c. and cockerel No. 20 4 c.c. of the same toxin in the same manner as the above-mentioned five chickens, and the only symptoms shown were slight droopiness and sitting down on the floor of the cage for several days, followed by complete recovery.

These experiments indicate the fatal dose when given by the mouth to be somewhat variable.

Experiments on Horses

Horse No. 1 was used in an effort to establish some idea of the fatal dose of toxin for this animal as compared to a guinea pig.

The animal was injected subcutaneously on January 8, 1920, with $\frac{1}{2}$ c.c. of type "A" toxin, series 5, amounting to 292 m.l.d. It remained normal until the third day, when it was slightly droopy. The symptoms progressed gradually until the fifth day, when the animal showed drooping of the head, marked weakness of legs, incoördination of movements and staggering gait. Attempts to eat grass from the pasture were successful in prehension but resulted in the bolus dropping from the mouth after efforts to swallow it had failed. On the sixth day the animal was down and made trotting motions with the fore and hind legs. There was marked jugular pulse, mouth held partly open and tongue lolling out. Pulse, 90, and very weak; respiration, 18; temperature, 99° F. The animal died on the night of January 14, after having shown typical symptoms of forage poisoning.

The small dose proving fatal showed that horses are more susceptible to the toxin injected subcutaneously than guinea pigs in proportion to body weight.

On February 18, experimental horse No. 4 was injected with the same dose of type "A" toxin as had proved fatal to horse No. 1, with the intention of giving antitoxin after symptoms developed. On the fifth day the horse showed weakness in the hind quarters, but no mouth symptoms, and was eating well. It was, therefore, decided to postpone treatment until the following day. During the night, however, the animal had apparently lain down in the pasture close to a deep ravine and in struggling to rise had fallen down the bank. On the morning of the sixth day it was found in the creek, having fallen a distance of 15 feet. The animal was in such a position that it could not be extricated without great difficulty. There was also danger of internal injury from the fall and it was considered not a satisfactory case to attempt to give the antitoxin treatment. The condition of the animal rapidly became worse and it was destroyed the following day.

On February 22 horse No. 5 was fed 3 c.c. of type "A" toxin, 1,200 m.l.d., in one quart of barley, and horse No. 6 was fed 6 c.c., 2,400 m.l.d., in the same manner. This was 4 and 8 times respectively the amounts that had proved fatal on subcutaneous inoculation, and was given to ascertain the dose by the mouth that would prove fatal. Somewhat to our surprise, both horses remained normal. On March 18, horse No. 6 was fed, in barley, 45 c.c. of type "A" toxin, testing 584 m.l.d. per cubic centimeter, or a total of 26,280 m.l.d. This large amount did not produce any abnormal symptoms. Thinking the animal had a strong relative immunity to the toxin and consequently could furnish quickly a potent antitoxic serum, it was given 3 c.c. of "A" toxin, 1,754 m.l.d., subcutaneously, on April 1. At the same time horse No. 5 was given 45 c.c. of "A" toxin, 26,280 m.l.d., by the mouth in barley.

On April 3, at 6 p.m. both horses were found to be markedly affected with the disease. They were sweating profusely and walked with a weak, staggering gait. At this time horse No. 6, which was more severely affected, was given 225 c.c. of type "A" antitoxin intravenously.

The following morning, both horses were down and unable to rise, showing typical symptoms of forage poisoning. Horse No. 5 had a pulse of 57; temperature, 100.2° F.; respiration, 18. Horse No. 6 had a pulse of 80; temperature, 100.6° F.; respiration, 20.

Each of the animals was given 225 c.c. of type "A" botulinus antitoxin, but no improvement was noticed from its use. Horse No. 5 died during the night and horse No. 6 the following night. These animals were, therefore, not favorably affected by antitoxin, despite the fact that No. 6 had received a total of 550 c.c., half of which was given in the early stages before the animal was decumbent.

The antitoxin used in these cases was the third bleeding from the "A" horse. It was tested again on April 7, 1920, and 1 c.c. protected a guinea pig against 3,500 m.l.d. of toxin when mixed and injected immediately. On April 13 a test was made in which the mixed antitoxin and toxin were allowed to stand at room temperature for one hour as in the standard method of testing tetanus antitoxin. In this case the serum gave complete protection to a guinea pig in the proportion of 1 c.c. to 11,680 m.l.d. This showed that the antitoxin was fairly potent.

Experiments on Cattle

On January 8 a thin yearling heifer, No. 186, was injected subcutaneously with 2,000 m.l.d. of type "A" antitoxin. The animal did not show any effect from the injection, despite the fact that the dose was 8 times the amount which had proved fatal to horses Nos. 1 and 4.

January 13 a very thin yearling heifer, No. 2069, was given a subcutaneous injection of 20,000 m.l.d. of type "A" toxin. In two days the animal showed weakness, with no effort made to eat or drink. On the third day the animal was down and unable to rise, nose dry, mouth slightly open and saliva dropping. The animal could get up on its hind legs but could not raise the front quarters. Its pulse was 95, temperature 99.0° F., respiration 36. On the fourth day the animal was totally unable to rise. It gradually became weaker, dying on the sixth day.

On postmortem small pieces (about 20 grams) of the liver, spleen and heart clot were placed in sterile flasks and kept on ice over night. The following day they were macerated in salt solution in mortars, and 1 c.c. of each was injected into guinea pigs. This was done to ascertain whether tissues from an animal injected with such a large dose of toxin would be toxic. All the guinea pigs remained normal.

Cattle are, therefore, resistant and probably could consume a very large amount of botulinus toxin by the mouth without effect. That they are not entirely immune is shown by this experimental

animal succumbing to the large dose of the material given subcutaneously.

Field Observations and Administration of Botulinus Antitoxin

The antitoxin was forwarded to veterinarians in several parts of the State where forage poisoning appeared, as well as used by ourselves in several cases. Under field conditions, on account of not being able to ascertain which type of toxin was causing the trouble, it was always necessary to give both types of antitoxin, and in such cases only one-half the total dose administered would be specific. No positive benefit was obtained with the use of this material therapeutically.

In one outbreak at Oxnard, 10 horses died of the acute form, after which 5 more animals developed the chronic type of the disease. Antitoxin was forwarded to Dr. A. L. Metz, the attending veterinarian, for these latter cases. He kept the animals in slings and administered subcutaneously 30 c.c. of each type to them every 7 days for 5 weeks. He reported a gradual improvement in the animals, but 2 of them were kept supported in slings for 3 months and the other 3 for 5 months. At this writing they do not require slings to support them, but have not yet gone to work. One is not justified in considering that the antitoxin administered in the manner described above in this type of cases had any therapeutic value.

In one other case, where the material was used by Dr. F. H. Baker, at Gardnersville, Nev., he made the following report to Dr. Edward Records of the Nevada Experiment Station:

"In regard to the mare treated January 12, 1920, for cerebrospinal meningitis: Disease commenced with paralysis of hind quarters, staggering gait, temperature slightly elevated, animal prone unless made to arise. This condition commenced two days prior to treatment, which consisted of the injection, subcutaneously, of botulinus antitoxin, type 'B,' 100 c.c. I did not see the mare again, but was informed by the owner that she had made a complete recovery and was back at work."

On cursory examination this might be considered a case where serum proved of value, but on more careful study several serious doubts make themselves apparent. The elevated temperature renders the diagnosis somewhat questionable. Only one type of antitoxin was used, and as most of the outbreaks in this section of the

country are caused from "A" type toxin, the specificity of the treatment is in doubt.

On December 20, 1919, we received word that horses were affected with the disease at Eugene, Calif., in a barn where forage poisoning had appeared the previous year. Upon arrival at the ranch the following day, two horses were found down with the disease and unable to rise. Each of these was given 200 mils of the antitoxin, from which no improvement was noticed. The animals were well advanced with the disease and died the following day.

The remaining four horses consuming hay from the same barn were given prophylactic doses of 40 c.c. of antitoxin and removed from the suspected feed. In handling these animals it was noticed that one was showing slight signs of the disease by weakness and irregular gait. This animal was given intravenously 200 mils of antitoxin in addition to the prophylactic dose of 40 mils given subcutaneously. The symptoms disappeared and the animal seemed to be normal to observation by the owner at the end of the second day. At the end of a week, on account of shortage of horses, the animal was put in the plow and worked throughout the day. During the evening it commenced to show signs of forage poisoning and was permanently decumbent the following morning and died toward evening. This animal, from the fact that it was later showing symptoms than the other horses, probably received a smaller dose of the poisonous material and might have recovered spontaneously. In such cases where the dose is just lethal, serum, after the early appearance of symptoms, may prevent a fatal termination. Hard work would be expected to aggravate the disease, as in experimental chickens which recover, fatigue quickly occurs for days or weeks after symptoms disappear.

On February 10, 1920, experimental horses Nos. 2 and 3 were placed in the barn where these cases had developed, and were left there for several months on the same feed, without showing anything abnormal. It was therefore evident that, if the hay stored in the barn had been the cause of the loss, but a small part of it must have contained the toxin. This barn contained cracks between the boards where rain could get in and wet hay lying against them. It would seem that such moisture might be the cause of growth of molds and *Bacillus botulinus* in only a small portion of the feed, which accounts for the experimental animals not becoming affected.

On January 15, 1920, we were called to a ranch where two horses had died since January 1 with symptoms indicating forage poison-

ing. At the time of our visit one horse was down with typical symptoms and another had shown slight indication the day before in the form of unsteady gait. This latter animal, however, was much improved and recovered without treatment. The horse that was down received 200 c.c. of antitoxin intravenously. No benefit was noticed and the animal died 48 hours later.

In an outbreak at Chicó, Calif., where four horses were affected with the disease, Dr. W. P. Jackson, the attending veterinarian, administered 200 c.c. of antitoxin to two of the animals and the other two were left as controls. One treated horse died first, followed by one control, after which the second treated horse succumbed and finally the second control animal.

The antitoxin has been used therapeutically on four human cases of the disease, all of which resulted fatally.

CONCLUSIONS

From the foregoing series of experiments and observations we conclude:

1. That a fatal dose of botulinus toxin produces a symptom complex in horses, indistinguishable from the symptoms in natural outbreaks of forage poisoning.

2. That spontaneous recoveries from botulism poisoning in chickens do occur even after symptoms are well marked.

3. That recoveries after the administration of antitoxin in field cases can not positively be credited to the therapeutic value of the material.

4. That botulinus toxin in all probability becomes early fixed in the tissues and the therapeutic value of antitoxin is not very great.

5. That its field of usefulness, therefore, will largely be confined to its prophylactic administration to animals on the same feed after one or more cases of the disease appear.

6. That the time following the administration of toxin and the appearance of symptoms depends to a considerable degree on the amount of toxin administered, and that in fatal doses symptoms may not appear for five or six days or longer.

7. When large enough doses are given, symptoms may appear in 24 hours or less.

8. A period of time may therefore exist between the appearance of first symptoms in rapidly developing cases and the first symptoms in late developing but fatal cases, in which the administration of antitoxin may prevent the fatal termination.

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In its efforts to hold down hog cholera with a reduced force, the United States Department of Agriculture is putting out a new type of poster. In a sense it is a service chart. Its picture says to the farmer, "When your hog looks like this, look out for cholera." The picture of a hog in colors shows the visible symptoms of the disease. There is printed on the poster information as to how to proceed.

▲ friend who is not in need is a friend indeed.—*Answers.*

LIMBERNECK IN POULTRY¹

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INTRODUCTION

DURING the past two years the Divisions of Poultry Husbandry and Veterinary Medicine have had occasion to observe a number of cases of so-called limberneck in poultry. Some of these cases were sent in by poultry fanciers over the State, some were brought in by local poultrymen, and a few cases were found on the University range.

Many inquiries have been received requesting information regarding the cause and treatment of "limberneck," "wry neck" and "chicken paralysis." The majority of writers refer to these paralytic conditions as a disease, but it would appear to be more correct, in our opinion, to refer to these paralyzes as symptoms of more deep-seated pathological conditions, brought about in all probability by toxins. We shall not attempt to answer this phase of the question, but merely to point out some of the theories and opinions held by scientists and poultry experts over the country, and describe the results of our attempts to produce limberneck in poultry under controlled conditions.

We (R. A. Dutcher and S. D. Wilkins) became interested in this problem after having observed a similarity between the limberneck symptoms in poultry and the paralytic symptoms in our polyneuritic pigeons which had been fed deficiency diets.

Examination of the literature reveals a great diversity of opinion among poultry experts as to the etiology of limberneck. The conviction exists in some quarters that these paralyzes are related in some way to the dietary history of the birds affected. For these reasons the experiments described in this paper were first initiated to determine if such relationships existed.

Since experimental data are meager, we have attempted to collect information from as many sources as possible, including poultry journals, text-books, questionnaires, etc., as well as from scientific sources, with the view of shedding further light on the problem, although it is recognized that some of this information leaves much

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to be desired. The collection of the various opinions held with regard to limberneck in poultry serves to show the need for further work in this interesting and important field.

Theories and Opinions Regarding Etiology

Dietary deficiencies.—Flexner (1) has suggested that the paralytic condition known as limberneck is a neurodystrophy like that of beri-beri, brought about by the feeding of inadequate diets. Kent (2) also argues that diet is an etiological factor, for he observes that the trouble occurs in late winter or early spring after a long period of feeding rations lacking in fresh and succulent foods. Buckley (3) believes that the paralytic condition brought about by feeding polished rice is identical with limberneck, while Conway (4) and Lockett (5) also associate these symptoms with dietary deficiencies. Shepler (6) emphasizes the fact that the composition of the feed is an etiological factor when the feeding period covers an appreciable length of time. She states that "one of the troubles most common in spring or early summer is a disease that so often attacks hogs, calves and sheep after being fed too long on concentrated feed. It has no real name but is generally attributed to indigestion, which really does occur in the beginning, but having known it so long in poultry, I know its true name to be intestinal inflammation due to an overabundance of dry fattening food, hurried on, in the case of fowls at least, by too little water. In poultry the disease is called limberneck."

Botulism.—Dickson (7) has studied the question of "food poisoning" in humans, and concludes that the toxic effect of spoiled food is due to the presence of a toxin elaborated by *Bacillus botulinus*. Portions of these spoiled foods produced limberneck in poultry, according to this writer, and he has therefore advanced the opinion that limberneck in poultry is a form of botulism or food poisoning. Dickson found that chickens are highly susceptible to subcutaneous injections and feeding. He has observed a sluggish movement of the nictitating membrane, sometimes a marked constipation, and usually a general weakness of the bird. Large hemorrhages around the base of the brain and upper part of the cord are practically always present in experimental chickens. Dickson makes the statement that "limberneck is supposed to be due to the ingestion of spoiled meat which is fed to the chickens, but it is known that chickens and turkeys can eat putrefying meat without suffering injury. It is reasonable to suppose that when limberneck symptoms follow inges-

tion of spoiled meat it is *Bacillus botulinus* which is responsible for the poisoning."

Van Ermengem (8) has found that chickens are highly resistant to intravenous, intraperitoneal and subcutaneous injections of botulinus toxin and are practically unaffected when fed large doses. Buckley and Shippen (9) and Graham, Brueckner and Pontius (10), have used chickens as experimental subjects in studying the organism causing food poisoning in horses and mules. The former found chickens refractory to cultures of *Bacillus botulinus* when fed as much as 30 c.c. daily for three or four days, but did find the droppings of these chickens pathogenic when fed to horses and donkeys, which would indicate that the hen is a carrier of *Bacillus botulinus*.

Graham, Brueckner and Pontius fed 6 chickens 45 c.c. of broth culture of *Bacillus botulinus* and the contents of 4 corn-agar slants of the bacillus during a period covering 9 days. During the next 35 days they fed the same chickens 268 c.c. of pork broth cultures of *Bacillus botulinus* and 5 c.c. of the botulinus gelatin culture. These feedings produced no noticeable effects. Burke (11) cites an instance where a jar of string beans, sterilized by the fractional method, was fed to chickens, 24 of them dying of botulism ("limberneck"). Kaupp (12) refers to *Bacillus botulinus* as the cause of true limberneck. In a recent article Hart (13) cites an instance of botulinus poisoning where more than 600 chickens died after eating spoiled canned beans. When the crop contents of the affected birds were fed to other experimental chickens similar symptoms were obtained. No mention was made that *Bacillus botulinus* had been isolated from any of the affected birds.

Parasites.—Pearl, Surface and Curtis (14) state that "limberneck is a symptom due to nervous disorders which arise from several different causes. It is usually associated with colic, acute indigestion, internal parasites or ptomaine poisoning." A prominent Canadian publication (15) advances similar opinions, stating that "limberneck is a disorder of the nervous system. It is usually the result of reflexes caused by disturbances of the digestive organs from severe attacks of indigestion or from worm parasites."

Miscellaneous poisons.—Hawk (16) associates limberneck with the ingestion of decayed flesh "or other indigestible or poisonous matter during excessively hot weather." Husselman (17) and Hicks (18) voice similar opinions concerning "putrid animal mat-

ter," the latter attributing the poisonous effects of decayed meat to ptomaines which have developed in the spoiled food.

Maggots.—Hastings (19) states that limberneck is not a disease but is "the result of eating maggots from dead carcasses," while Ward and Gallagher (20) believe that "limberneck is a symptom resulting from partial or complete loss of control of the muscles of the neck. Feeding on maggots from decaying meat will cause limberneck."

A technical bulletin (21) published by an incubator firm disagrees with this view, holding that "maggo's can be fed to poultry in any quantity without danger of causing illness. It is the product of the decaying flesh that causes the mischief, not the maggot that is converting the decay into safe form for food." Boyer (22), on the other hand, is convinced that maggots are the primary cause of limberneck in fowls.

In an attempt to associate limberneck with the ingestion of maggots, a writer from the New Jersey Experiment Station (23) gives a very good description of limberneck symptoms. This writer states: "The chicks within a very few hours would change from a normal healthy appearance and activity to an almost prostrated condition. They would lose the use of their legs more or less completely, lying on their sides and struggling as though they were in great pain. In the worst cases the muscles of the neck seemed to be uncontrollable and the head was thrust forward on the ground. In a few cases visited, the carcasses of cats and dogs were found among the tall weeds on the range. All such carcasses, whatever the source, exposed to the air and flies, soon became filled with maggots or young flies. The chicks eating these maggots were affected in a similar manner to the fowls which had eaten of the decayed flesh."

Saunders (24), who has done more than any other investigator to advance experimental data to prove that flies play an important role in the development of limberneck, states:

The green fly epizootic, as I have formulated the theory of its workings, is propagated as follows: The female insect feeds upon the carcass of a victim, upon its excretions (or the excretions of a case of poliomyelitis) and becomes potentially infected. After three days the ova deposited are toxivirulent. The creature which receives these toxivirulent larvæ, within a few hours, or certainly within a few days, becomes the subject of motor paralysis and death. A chicken died within six hours after swallowing three larvæ. All attempts to inoculate fowls or guinea pigs or other

animals with the blood or tissues of animals dying from ingestion of the specific larvæ have failed. On the other hand, the carcasses of the animals dying—usually within a few hours, sometimes several days after the ingestion of the specific larvæ—never failed to infect green flies so that their larvæ from ova deposited the third day after feeding were toxivirulent. We could kill a young fowl or guinea pig of any age, sometimes within six hours, by the oral administration of a single specific larva. An old rabbit was killed within two hours by the injection intraspinaly of a few drops of the filtered emulsion of the specific larvæ. This acute spinal paralysis affects all of the scavengers on the farm and spares the clean animals, and the theory of limberneck resulting from the consumption of carrion has been utterly disproved by our experiments in feeding fowls on putrid flesh, even when seething with maggots. Besides these experiments in the laboratory I have accumulated a large amount of information from all over the country tending to show that it is not putrid flesh nor even maggots in putrid flesh as such, which produce limberneck in fowls, but that maggots grown in the carcass of the fowl or in that of any animal which died of a limberneck virus, are capable of producing speedy paralysis in any animal which devours them."

The fly, *Lucilia caesar*, is conspicuous because of its bright metallic, greenish copper color. According to Herms (25) it is typically a fly of the out of doors and is a very good scavenger. On bright, sunny days we have observed this fly in large numbers on the dung balls of chickens; it is very abundant in hog pens and around rabbit hutches and in some places around guinea-pig cages. We have had no difficulty in inducing this species to come into buildings, especially if a dead animal or chicken has been close to the window. It has been very numerous in the poultry brooder houses on days when hard, steady winds have occurred, and noticeably abundant on rainy days. Herms (26) states that this fly rarely comes into the house and seldom remains long, owing to its rapid response to differences in light intensities.

At one time we observed that the introduction of *Lucilia caesar* into a fly-proof animal cage was followed almost simultaneously by the deposition of larvæ on the carcass of the animal within the cage. This would indicate that this species of fly is both oviparous and viviparous. It is said (27) that *Lucilia caesar* causes cutaneous affections by depositing its larvæ in the skin of man and of animals. Herms (28) gives the following data relative to the metamorphosis of this fly: "Egg stage, 8 to 48 hours; feeding period, 2 to 7 days; prepupal stage, 2 to 7 days, and pupal stage, 8 to 17 days. In the

female the ova are ripe in from 9 to 21 days after emergence from the pupa case." The period of metamorphosis is greatly effected by temperature conditions.

In December, 1919, a case of limberneck occurring in one of the brooder houses at the University Farm was reported to us. Inspection of the house a few days later showed that *Lucilia caesar* was present. This suggests the possibility that this fly may become an inhabitant of houses even in this severe winter climate.

DATA OBTAINED BY QUESTIONNAIRE

At the beginning of our study the following questionnaire was sent to poultrymen, poultry husbandry specialists, poultry journal editors, veterinarians, bacteriologists and others throughout the United States and Canada:

Questionnaire

1. Do you consider limberneck to be due to (a) Dietary deficiencies? (b) Parasites? (c) Bacteria? (d) Consumption of salt or other substance? Upon what grounds do you base your statements?

2. Have you found the disease more prevalent in winter than in summer? In this connection do you consider that an adequate supply of green food prevents the development of the disease? Kindly state what green feeds you have used.

3. What methods of treatment, in your opinion, should be used in actual practice to cure the birds?

4. Have you found the disease more prevalent in young chicks than in mature fowl?

5. Kindly give any other statements relating to the disease which might not strictly come under the above questions.

6. What, in your opinion, is the most authoritative published work concerning this disease?

7. Have you any objections to any information you give being used in any publication in connection with an experimental study of the disease? If you prefer to have your replies tabulated by number rather than by name, kindly indicate such preference.

Ninety-six letters were received in reply to the 126 questionnaires, and approximately 50 per cent stated that the writers had no knowledge concerning limberneck, while but few replies were received in which all of the questions had been answered.

Five people indicated that limberneck was due to dietary deficiencies; nine were of the opinion that the disease was due to bacteria, while four stated that it was due to the consumption of

salt or other substances. Three replies were to the effect that the disease was more prevalent in winter, while twenty stated that more cases were found during the summer and fall months. Fourteen wrote that the disease was found chiefly in mature fowl, and three people found it most prevalent in young chicks.

Twenty replies gave methods for the treatment of limberneck, and these included the use of Epsom salts, olive oil, castor oil, ground onion and dandelion, mixtures of equal parts of olive oil and turpentine, one-tenth grain doses of strychnine given three times daily, bismuth, aconite, asafetida pills, complete change of diet, grass range, and one writer indicated that the only therapeutic agency known to give satisfactory results was "the axe." The term "ptomaine" was used by many in their replies. In the few letters which stated that green food was a factor in preventing this trouble, the use of alfalfa, clover, kale, dandelions and onions was recommended.

The replies to question No. 1 indicate that limberneck may be due to the consumption of (1) decayed potatoes; (2) spoiled lettuce; (3) moldy grain; (4) spoiled canned vegetables, such as corn, beans, peas and asparagus; (5) dead chickens, gophers, cats and rats; (6) spoiled green cut bone; (7) tainted beef scraps; (8) loose smut of barley; (9) polished rice; (10) intestinal parasites; (11) bacteria; (12) maggots; (13) paint skins; (14) spoiled commercial protein feeds, such as cottonseed meal and blood meal; (15) toxalbumose in the larvæ of a specified species of fly; (16) rock salt or other forms of salt; (17) excessive amount of fattening foods.

It is readily seen from the replies to the questionnaire and the data obtainable from the literature that there is considerable difference of opinion regarding the etiology of limberneck.

A number of letters were received in which reference was made to the proper usage of the term limberneck. There seem to be a number of conflicting opinions as to what symptoms ought to be classified as limberneck symptoms. Some of those who returned questionnaires indicated that the condition characterized by a turning back of the head (see figure 1), where the head rested on the back between the wings, was not limberneck. This type of paralysis is sometimes spoken of in poultry literature as "wry neck," and the users of this latter term are generally insistent that the two terms are not synonymous. Others indicated that only in cases where the

head hung down so that the beak might touch the ground could the term limberneck be applied.



Fig. 1.—White Plymouth Rock Cockerel. A characteristic limberneck symptom sometimes called "wry neck." This chick was found on the University Farm range, July 6, 1919.



Fig. 2.—White Plymouth Rock Cockerel. Same chick shown in figure 1, but illustrating a different type of limberneck as indicated by position of head. Temperature of chick when found on range was 107.0.

We believe from the results of our experimental work that the term limberneck can properly be applied to cases where the head hangs down (29), to those cases where the head is thrown back

between the wings, and to cases where the head is turned to either side through an angle varying from a few degrees to as many as 180 degrees. Since, experimentally, all of these types can be produced in pigeons on the same deficient diet, indicating that the position of the head is dependent upon the particular muscle or group of muscles affected, there should be no confusion in the use

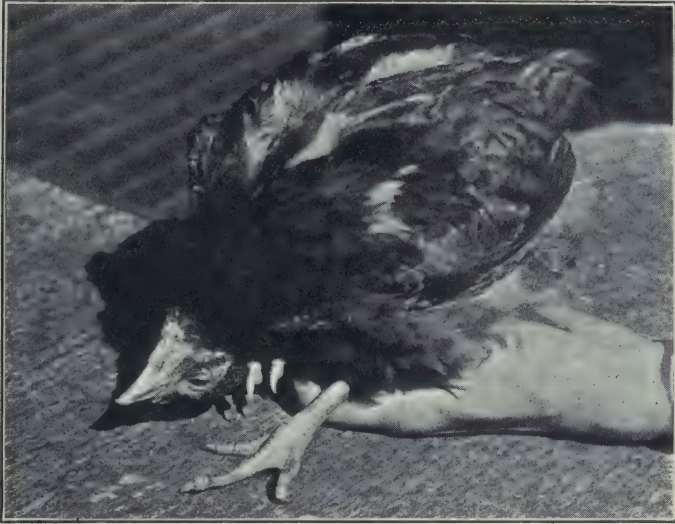


Fig. 3.—Rhode Island Red Cockerel. This photograph illustrates another type of limberneck, the head being turned through an angle of 180 degrees. Its temperature when found in this condition was 106.3. Diet consisted of commercial scratch feed, ground mash feed, buttermilk and succulent green alfalfa. This indicates that an adequate diet does not protect against the onset of limberneck symptoms.

of this term. Figures 1, 2, 3, 4 and 5 illustrate the different types found in this disease.

We have also felt that we were justified in making experiments to test out certain of those views which were substantiated simultaneously by several individuals widely separated geographically. We realize, fully, that too great emphasis can not be laid upon observations made by untrained observers working in the field of practical poultry raising. However, the collected opinions and observations, from all sources, have been of interest and value in bringing out the fact that limberneck occurs quite generally in widely separated sections of the country, and also it is quite evident that a great diversity of opinion exists, even among scientific workers, as to the primary causes of limberneck.

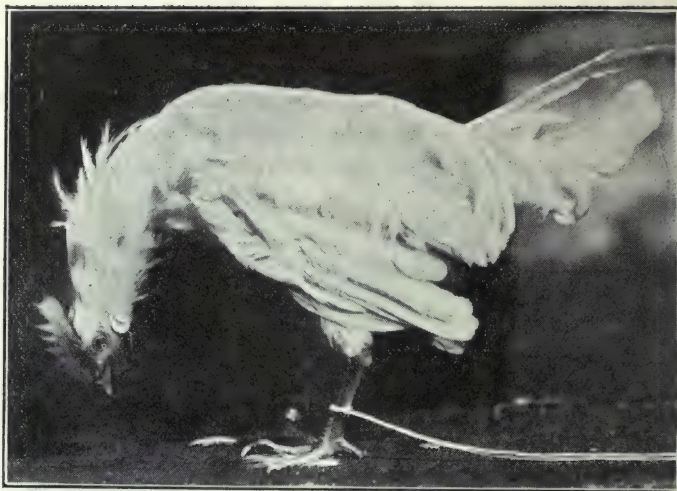


Fig. 4.—Single Comb White Leghorn Cockerel No. 177. Sixty-three days after this cockerel was inoculated with *Bacillus botulinus* culture the symptoms shown in the photograph were observed. The head appendages were pale in color for a few days following inoculation, but no limberneck symptoms were manifest. Since this cockerel presented a normal appearance two days after it was found in the condition shown, it suggests the possibility of consumption of toxic green flies (*Lucilia caesar*).



Fig. 5.—Cross-bred Cockerel. This chick was obtained from a farm where limberneck in chickens, paralysis (of hind quarters) in hogs, and paralysis of the limbs in certain members of the farmer's family occurred simultaneously.

EXPERIMENTAL STUDY

Methods

The chickens used in this study were Single Comb White Leghorn cockerels, 8 to 10 weeks of age and weighing from 450 to 900 grams. These birds were obtained from a commercial egg farm and previous to the experiment had been fed a ration that was ordinarily used on such farms. The necessity of using, for experimental purposes, birds or animals which have been fed rations on which small normal growth has been obtained is of much importance, for, as Laurie (30) has stated, "the thoughtful reader must agree that the presence or absence of certain constituents in the food consumed by man, beast (or bird) must have a *cumulative* even if not an immediate effect."

Hughes (31) has observed that exercise is not an essential factor in the abnormal development of the leg bones of chickens. In order that our birds might be kept under conditions as nearly normal as possible they were placed in well-lighted pens, 4 by 9 feet in size, with a separate roosting closet 3 feet square.

McCarrison (29) has emphasized a point in polyneuritis studies with pigeons which we believe is of importance in conducting feeding experiments with poultry, namely, the segregation of the sexes. This writer segregated 11 pigeons in separate cages, while 20 pigeons were congregated in two large cages. In the former case it required 85 days for the segregated birds to die of the disease and 80 days to acquire it. When the birds were congregated it required but 66 days for them to die of the disease and but 61 days to acquire it. This, he says, "I consider to be due in part to the quieter life led by the isolated pigeons. In the retirement of their cages their metabolic fires burn less briskly, their sexual desires in the absence of the female and the competitive male are less ardent. Thus are conserved the resources of the endocrine glands on which so much of the morbid processes of deficiency disease is dependent."

From our observations in this study we believe that it is equally important where cockerels are used that each bird should be separated. This is especially necessary where the birds vary in age and where one or more of them have reached the age at which they begin to tread. No evidence of treading was observed in the pens of cockerels where the diet more nearly approached the normal, due, perhaps, to the fact that on such a diet all of the birds were equally vigorous and able to hold their own against any other bird

in the pen. In other pens where polished rice was the sole food the larger birds often bothered the smaller ones and removal of cockerels was necessary at times.

The birds were supplied with clean, sharp grit at all times. Water was always available, the water dishes being cleaned daily by washing in a solution of cresol. Clean oat straw was placed on the floor of each pen and was renewed when it had become well broken by the scratching of the birds.

In order that we might have extra birds for future experiments two pens of cockerels were placed on a normal diet. This was composed of whole grain, which they were forced to dig out of the litter, and a dry mash was placed in the hoppers where it was available at all times. The dry-mash ration was composed of equal parts of yellow corn meal, wheat bran, wheat middlings, ground whole oats and beef scrap.

The whole-grain ration was a prepared commercial scratch food supplied by the Poultry Husbandry Division and we have no knowledge as to its composition. That the ration is adapted to the growth of young chicks 6 to 10 weeks of age is evident, since on the normal diet these chicks increased their weight an average of 500 grams in 30 days. No attempt was made to force the growth by feeding wet mashes or by other commercial practices. The weights of our control birds agree with the results reported by Card and Kirkpatrick (32), which show that 10 White Leghorn chicks 15 weeks of age should weigh from 22 to 23 pounds. Eleven of our chicks weighed 29 pounds at 14 weeks of age. These birds were kept confined at all times.

Previous to the beginning of this study, screen doors and windows were placed on the house to keep out flies and other insects. In spite of every precaution flies have been observed in some of the pens. The significance of this is commented upon later.

During the experiment 1,015 temperature readings were made, the temperatures being taken by inserting a high-grade clinical thermometer into the cloaca. Eight hundred and seventeen weighings of the birds were made, and the respiration movements were observed in the case of birds fed on salt, particularly in the cases where there was a characteristic "air hunger" movement.

Dietary Deficiency Experiments

One pen of cockerels was placed on an exclusive diet of polished rice which was supplied them in an automatic hopper so that they

could eat at will. This diet was given for a period of 37 days. The results obtained are given in Table 1.

TABLE 1.—*Variations in weights of cockerels on a diet of polished rice*¹

Day of experiment	Weight in grams						
	No. 164	No. 268	No. 453	No. 485	No. 163	No. 452	No. 487
1	811	489	514	793	768	452	800
4	857	503	431	848	822	486	850
8	872	498	457	838	838	469	799
12	898	474	428	840	849	461	800
16	879	472	422	858	850	476	806
20	718	420	392	822	811	481	800
24	638	437	376	848	813	491	805
28	580	426	300 ²	821	810	480	800
30	529 ³	426	...	801	820	481	800
32	⁴	428	...	831	797	480	818
34	...	411	...	839	798	495	812
36	...	400	...	836	795	496	822

¹ All weights of chicks recorded in this paper are expressed in grams.

² Died, inanition (?).

³ Severe polyneuritis.

⁴ Died, polyneuritis.

On the thirty-seventh day cockerels 452, 268 and 487 were caponized (the right testicle only was removed) and together with the other birds were placed upon a diet of polished rice and green alfalfa. The results obtained during the following 46 days are given in Table 2.

TABLE 2.—*Variations in weights of cockerels on a diet of polished rice plus alfalfa*

Day of experiment	Weight in grams				
	No. 268	No. 485	No. 163	No. 452	No. 487
38	399	856 ¹	805 ¹	498	849
40	375	843	863	502	865
42	²	...	...	...	...
44	...	877	877	509	908
47	...	887	897	516	921
61	...	918	926	517	942
73	...	939	1,110	552	985
77	...	950	1,127	573	990
82	...	982	1,127	578	1,034

¹ Not caponized.

² Died, emaciated.

On three occasions, during the 37 days of rice feeding, the eyes of cockerel 485 became inflamed. We removed at one time a piece of cheesy matter about the size of a navy bean from one eye and washed the eye with a boric acid solution. On both of the other occasions the bird was given 1 gram of butter and within 2 days there was no evidence of soreness, but after a week or more of rice feeding it reappeared. The butter feeding was conducted in an attempt to associate this condition with the deficiency disease known as xerophthalmia, which may be produced in albino rats (33), rabbits (34) and humans (35) by diets deficient in the fat-soluble vitamine. While our results in this single case were encouraging, we hesitate to draw conclusions until we are able to repeat the work on a larger number of birds.

A comparison of the data in Tables 1 and 2 indicates that a considerable increase in body weight of birds fed on polished rice is possible through the addition of green alfalfa to the diet. The significance of green food in the diet will be brought out in a later paper.

Two birds in the pen receiving rice only (Table 1) showed paralytic symptoms. No. 164 became pronouncedly paralytic on the thirtieth day of the experiment and died on the thirty-second day. Its temperature on the thirtieth day was 106.5° , although it had been as low as 105.2° on several previous occasions. A short time before death its temperature was 104.0° . Chick 268 became paralyzed on the thirty-seventh and died on the forty-second day. This bird did not show any paralysis of the neck muscles, but was unable to stand after the thirty-sixth day. Its temperature was 107.4° two days before it died, and 106.1° five hours before death. Progressive lowering of the body temperatures is characteristic of true polyneuritis (29, 36), and is in contradiction to what we have found in the limberneck birds, both those which we have found on the University Farm range, and in birds brought to us, as well as in the cases which we have produced experimentally. McCarrison (29) states that a high temperature immediately before death indicates a bacterial infection, and in his studies of polyneuritis he has used this method as a means of separating the infected from the noninfected birds. He states that where the disease (polyneuritis) is due to the lack of accessory food factors alone there should be no fever.

From the data which we have obtained in the feeding of polished rice as the sole diet of these chickens, as well as of pigeons, we must conclude that there is no relation between the paralysis we

have been able to obtain by such feeding and the paralysis as found in the limberneck chickens with which we have worked.

We have had no cockerels (affected with limberneck) of an age where the reproductive organs were sufficiently developed so that observations could be made, and so can not compare the testicles of limberneck birds with those of polyneuritic birds. We know (29) that in the latter case a decided atrophy of the testicles as well as most of the other endocrine glands is characteristic, but we have no evidence that the same thing is true with limberneck. We have been advised that mature hens affected with limberneck will continue to produce eggs, and there seems to be no reason why there should be lessening of the functioning of the male reproductive organs. Further experiment may show an examination of the reproductive glands to be an accurate method of distinguishing between true polyneuritis and limberneck.

Only in the external characteristics, such as the lack of coördination of movement and the peculiar positions of the head, is there anything in common, apparently, between limberneck and polyneuritis. No further study of dietary deficiencies was made, since it appeared that in polyneuritis and limberneck we were working with two unrelated diseases.

Botulism Experiments

A second phase of our study was to attempt to determine the relation of *Bacillus botulinus* to limberneck. Since no one, to our knowledge, has used in the literature covering their experimental findings photographs of chickens (which have developed limberneck as a result of inoculation with *Bacillus botulinus* toxin or as a result of eating food in which this toxin has been found), we had no previous knowledge as to whether the external symptoms of limberneck (botulinus) corresponded with the symptoms observed in chickens which have been found on the University Farm range or with those which have been brought to us. In our study we have used various strains of *Bacillus botulinus*.

Experiment I.—On July 9, 1919, nine cockerels were fed or inoculated with *Bacillus botulinus*, designated as strain "A." The history of this culture is as follows: Received from Zae Northrup Wyant, of East Lansing, Mich. This culture had been sent to the New York State Board of Health from Harvard Medical School. Growth was obtained in glucose broth by covering the surface of

the broth with a sterile paraffin oil. The culture as sent to us was designated Albany 175. It was not filtered before use.

The chicks in Group 1 were given an intravenous injection (axillary vein) of 1 c.c. of the culture, representing 0.001 c.c. of the original culture. The dosage of chick 466 is uncertain, due to a faulty syringe. Birds in Group 2 were given the same amount of the culture as was given to those in Group 1, but in the second

TABLE 3.—*Weights and temperatures of birds just previous to inoculation or feeding of botulinus culture in Experiment I*

Group	Chick No.	Weight	Temperature ¹
1	466	833	106.8
	284	945	107.5
	459	653	107.0
2	469	805	107.2
	187	806	107.1
	177	795	107.6
3	483	883	107.4
	475	892	107.2
	494	885	107.4

¹ All temperatures of chicks recorded in this paper are in Fahrenheit degrees.

instance the material was administered by crop. The birds in Group 3 were given 1 c.c. of the original glucose-bouillon culture pipetted directly into their crops.

TABLE 4.—*Temperature observations ten and twelve hours after inoculation or feeding of botulinus culture*

Group	Hour	Chick No.	Temperature
1	7:30 p. m.	284	106.4
	"	466	107.0
	"	459	107.3
1	10:30 p. m.	284	106.6
	"	466	105.9
	"	459	106.5
2	"	469	105.6
	"	187	105.7
	"	177	105.5
3	"	483	105.5
	"	475	105.8
	"	494	105.6

In general, these birds did not appear different from those which had not received the *Bacillus botulinus* culture. Chick 466 tried to fly to a roost about 6 feet above the regular roost in the pen but gave up after several attempts. Chick 459 reached the high roost on the first attempt. None of the other chicks attempted to fly. Several birds which had not been inoculated or fed on the culture were removed from the high roosts in other pens to see what they would do. Some of these birds made several trials to reach the upper roost; a few of them were successful, and the others gave up further attempts. Since the normal birds behaved very much like those which had been inoculated, no significance could be attached to the fact that most of the inoculated birds either made no attempt to reach the high roost or else failed in most instances to do so.

We found no data relating to the diurnal variations in the body temperatures of chickens. The temperatures of normal birds, both cockerels and laying fowl, were taken at the same time that the observations on the inoculated birds were made. We found that no

TABLE 5.—*Weight and temperature observations of chicks in Experiment I three days after inoculation or feeding of botulinus culture*

Group	Chick No.	Weight	Temperature	
			10:30 a. m.	10:30 p. m.
1	466	860	107.0	105.6
	284	1,013	108.2	105.8
	459	672	106.7	105.8
2	469	865	107.2	105.8
	187	864	107.0	105.4
	177	840	108.0	105.0
3	483	883	107.3	105.1
	475	918	107.0	105.1
	494	883	106.7	105.4

significance could be attached to the seemingly subnormal temperatures of the inoculated chickens (night temperatures), since it was found that the diurnal variations in body temperature of the laying fowl and of the normal cockerels was the same as that of the experimental birds. This variation had a range of from $1\frac{1}{2}$ to as much as 3 degrees in normal birds.

The temperatures of the inoculated birds were taken every two or three hours (approximately) up to midnight, during the following week to ten days. The weights and temperatures (given in Table 5) recorded on July 12 show very clearly the response of these birds to the inoculations and feedings of the botulinus cultures. This table should be compared with Tables 3 and 4.

The chicks in Group 3 made smaller gains than the others, remained in a squatting position for several days after being fed the culture, and all showed much mucus in the mouth, a condition which was not observed in the other chicks. There was no indication of constipation in any of these birds. The chicks in this experiment were placed in a separate pen and observations continued.

On the 14th of July the chicks in Groups 1, 2 and 3 were normal in appearance save for a noticeable paleness in the head appendages, and none of these birds, with the exception of chick 177, subsequently showed any symptoms of paralysis or limberneck. Sixty-three days after inoculation cockerel 177 showed the symptoms as in figure 4. Since this bird was normal two days after it was found in this condition, there is little reason to suspect that this case of limberneck was due to the ingestion of the *Bacillus botulinus*. A discussion as to the probable cause of the paralyzed condition of this bird is given in the latter part of this paper.

Our conception as to the symptoms of true limberneck can best be understood by referring to the figures 1 to 5, inclusive, and comparing these with figure 6, which represents a chicken poisoned with *Bacillus botulinus*.

TABLE 6.—Initial weights and temperatures of chicks and the amount and kind of culture used in Experiment II

Chick No.	Weight	Temperature		Culture	Amount
		2:00 p.m.	10:45 p.m.		
496	1,118	107.7	107.1	Bouillon, crop	1 c.c.
473	1,116	107.4	106.1	" "	" "
166	823	107.0	106.4	Bouillon, subcutaneous	" "
460	834	107.3	107.4	" "	" "
171	827	107.0	108.4	Bouillon, intravenous	" "
174	983	107.2	107.5	" "	" "
297	1,086	107.2	105.4	Agar, crop	" "
492	871	107.9	107.5	" "	" "

Experiment II.—On July 11 eight cockerels were either inoculated or fed on cultures of *Bacillus botulinus*, strain "B," the history of

which is as follows: Received from Dr. Robert Graham of the University of Illinois; other than this we know nothing of its source. The culture was grown in the same manner as that of strain "A." Subcutaneous and intravenous injections were made from the bouillon culture, and both the bouillon culture and an agar culture of the same strain were fed to some of the birds.

Further temperature observations were made during the following two weeks, but the data recorded are not unlike those of the three days immediately after inoculations and feeding, which are shown in Table 7.

TABLE 7.—*Temperature and weight observations one, two and three days after inoculation and feeding botulinus culture in Experiment II*

Chick No.	Temperatures July 12			Temperature July 13, 11:30 a.m.	Temperature July 14, 9:00 a.m.	Weight July 14, 9:00 a.m.
	9:30 a.m.	2:30 p.m.	9:30 p.m.			
496	107.0	108.1	106.2	106.9	107.5	1,112
473	106.7	107.2	105.7	106.2	106.8	1,115
166	107.0	107.9	105.4	107.1	107.4	807
460	107.6	107.9	105.3	107.0	108.2	839
171	106.8	107.4	106.0	106.8	107.1	840
174	106.4	107.7	105.6	107.0	107.2	986
297	106.4	107.2	105.4	106.4	106.5	1,110
492	107.3	107.7	106.2	106.5	107.9	867

On July 18 all of these chicks with the exception of No. 473 had made substantial increases in weight and their temperatures were normal. In all of the birds fed by crop the comb and wattles became almost colorless. None of the other birds showed any indication of abnormal condition. These birds were under observation during the following 90 days, although but a few more weighings and temperature observations were made. None of the chicks in this experiment subsequently developed paralytic symptoms.

Experiment III.—On September 18 four cockerels were used in further experiments with *Bacillus botulinus*. The culture, No. 175-B, was received from Zae Wyant of East Lansing, Mich., with the following history as to its source: "Isolated by the New York State Board of Health Laboratory from home-made cottage cheese which had caused the death of three persons."

The culture medium was made of 1 per cent of glucose bouillon (beef) to which had been added one-third of its volume of cooked pieces of beef. The medium was prepared in 500 c.c. Erlenmeyer flasks. The flasks were inoculated from agar cultures and incubated for six days at 25°C., at the end of which time they were removed.

Two guinea pigs were inoculated with the unfiltered broth culture to obtain a relative idea as to the toxicity of the culture before chickens were inoculated. Before inoculations were made the purity of the culture was confirmed by microscopical and cultural tests.

Guinea pig No. 1 received a subcutaneous inoculation of 1 c.c. of the culture, while pig No. 2 received 0.5 c.c. of the culture in the same manner. Both pigs died within 16 hours. Postmortem examination showed hemorrhagic areas at the point of injection, the area being bathed also with a yellowish edematous fluid. Very few bacteria were observed in smears, but those present were typical of *Bacillus botulinus*.

The dosages given to chickens, together with the initial temperatures and weights and the temperatures on several succeeding days, are shown in Table 8. Since earlier experiments indicated that as much value could be attached to the temperatures taken during the day as could be allowed for those taken at night, none but morning temperatures were recorded.

No further temperature observations were made on these birds, since, from the data previously obtained, it was evident that they were reacting in the same manner. Although the temperature of chick No. 165 fell as low as 104.8° , this bird did not give the slightest evidence that it was not in normal condition excepting perhaps the slight paleness of comb and wattles. Since normal birds of this breed very often show lack of color in the head appendages during hot weather (especially those birds which have a thin, high comb and long, pendulous wattles), no positive significance can be attached to the observations on paleness of head appendages of these inoculated birds.

The two cockerels which received the culture in the breast muscles both gave evidence of being somewhat abnormal, for they were very inactive and in the case of chick No. 188 staggering was observed. The culture used in this experiment was unfiltered. None of these chicks showed symptoms which are at all comparable to the clinical picture as shown in figures 1 to 5.

Experiment IV.—On September 25 an 8-day broth culture of 175-B as grown for the previous experiment, but filtered germ free through a Berkefeld (Mandler) filter, was injected subcutaneously into 6 birds. Sterility of the toxin was confirmed by aerobic and anaerobic inoculations. Previous to inoculating the chickens 4 guinea pigs, each weighing about 350 grams, were inoculated subcutaneously with this filtered toxin as follows: No. 1, 1 c.c.; No. 2,

0.5 c.c.; No. 3, 0.2 c.c.; No. 4, 0.1 c.c.. All of the pigs were dead within 17 hours. No postmortem examinations were made.

TABLE 8.—*Weights, temperatures and dosage of chicks in Experiment III*

Chick No.	Date	Weight	Temperature	Dosage and observations
493	Sept. 18	1,417	108.2	5 c.c. by crop. 2 c.c. injection in pectoral muscle ½ c.c. injection in pectoral muscle 15 grams beef culture by crop
188		1,357	108.0	
497		1,503	108.5	
165		1,500	107.8	
493	Sept. 19	108.3	Staggers
188		.....	108.2
497		.....	108.0
165		.....	107.8
493	Sept. 20	.....	108.0
188		.....	108.5
497		.....	107.8
165		.....	108.2
493	Sept. 21	.....	108.1
188		.....	108.5
497		.....	107.8
165		.....	108.1
493	Sept. 22	105.7	Staggers
188		.....	105.2
497		.....	106.4
165		.....	104.8
493	Sept. 23	.....	105.2
188		.....	105.5
497		.....	106.4
165		.....	105.0
493	Sept. 24	1,315	106.2	
188		1,197	105.6	
497		1,400	105.1	
165		1,490	106.0	
493	Sept. 25	107.4	Staggers
188		.....	106.6
497		.....	105.9
165		.....	107.8
493	Sept. 26	.....	107.0
188		.....	106.9
497		.....	107.4
165		.....	107.7

Six chickens, two of which had previously been caponized during an experiment in studying normal development of the reproductive glands of birds, were inoculated and the data shown in Table 9 were recorded.

TABLE 9.—*Temperature and diagnostic observations of chicks in Experiment IV*

Chick No.	Date	Temperature	Dosage and observations
233	Sept. 25	108.1	3 c.c.
270		107.9	2 c.c.
457		107.4	1 c.c.
488		108.4	0.5 c.c.
455		107.5	10.0 c.c.
500		107.3	5.0 c.c.
233	Sept. 26	103.8	
270		104.6	
457		104.7	
488		104.4	
455		105.8	
500		105.2	
233	Sept. 27	106.2	Profuse diarrhea
270		105.2	Slight indication of diarrhea
457		105.8	Apparently normal
488		105.3	" "
455		105.2	Bird unable to stand, comb dark, wings spread at sides, respiration 16 per minute
500		104.2	Bird sits down a great deal but moves more than No. 455. Legs shake when standing; respiration 18 per minute
233	Sept. 28	105.5	Comb dark; head inverted; bird refuses to stand
270		105.2	Bird appears normal
457		107.0	" " "
488		105.0	" " "
455		102.0	Paralyzed on right side; respiration 15 per minute
500			Died during night. Autopsied Sept. 29
455	Sept. 29	96.8	Died during night
233			Died during night

Postmortem examinations were made on the three chicks that died. No hemorrhages were found at the base of the brain; the spinal cord and lungs were normal in all three specimens. There were congestion of the liver and slight intestinal hemorrhages in all three birds.

Chick 270 died October 1. No autopsy was made. Chicks 488 and 457 died November 26. Both were apparently normal, but on November 26 they suddenly became sick and showed symptoms of a general depression. The head and neck remained normal, but the wings dropped at the sides. Both birds suddenly fell dead from the standing position. Postmortem examination showed hemorrhagic areas in the intestinal tract, more pronounced in the duodenum but extending back to the colon and then gradually lessening. The brain and cord were normal in both birds. Cultures from the heart, liver and spleen gave no growth.

Cans of commercially prepared beans, peas and corn were inoculated with culture 175-B. There was no indication of growth in the peas and beans. The can containing the corn was badly bulged and after eight days' incubation was opened and the contents fed to two cockerels. The chicks refused to eat the corn for two days. On October 20 the temperature of chick 217 had dropped to 104.1, while that of chick 242 was 105.0°. October 21 the temperatures



Fig. 6.—Single Comb White Leghorn Cockerel. Fed on spoiled canned corn which had previously been inoculated with *Bacillus botulinus*. This bird remained on the floor in the position shown, and had a low body temperature and low respiration in contrast with the limberneck birds shown in figures 1, 2, 3, 4 and 5.

were 103.6 and 102.7, respectively. Chick 217 died at 4:10 p. m. October 24, its temperature at noon of the same day being 97.2°. Figure 6 is a photograph of chick 242 one and one-half hours before its death. Both of these chicks, after October 20, were paralyzed to an extent where they were unable to stand, and it was with difficulty that they could be aroused from sleep. Respiration became greatly lessened, dropping as low as 17 and 20 per minute.

Feeding Miscellaneous Materials

Another phase of our study related to the consumption of salt, spoiled meat and other substances as possible etiological factors in the development of limberneck.

Six cockerels were fed a sample of spoiled sausage, obtained from the local market. The birds ate voraciously, consuming more than 8 pounds of the spoiled meat in 3 days. No abnormal conditions could be observed in any of these birds.

At about the same time one bird was fed on paint skins scraped from pails of lead-and-oil paints. No record was kept as to the amount of the skin ingested by this bird, but after a few days' feeding the crop of the chicken became packed so that the bird had

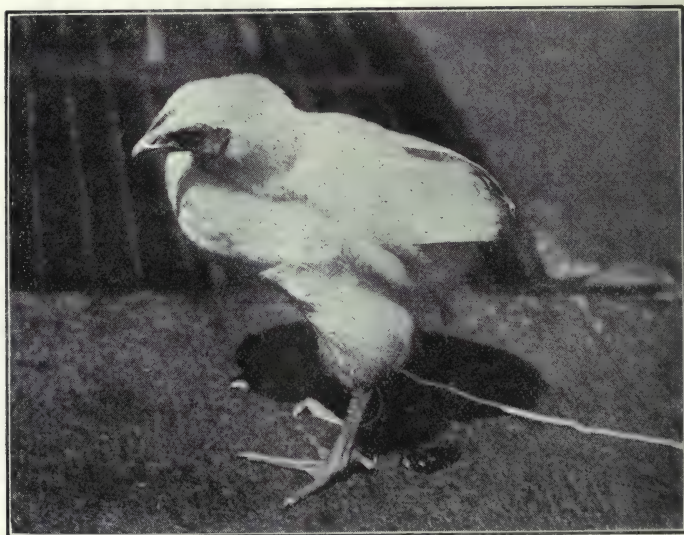


Fig. 7.—White Plymouth Rock Cockerel. Photograph of limberneck bird shown in figures 1 and 2, taken three days later. This chick was given a "water-soluble B" vitamin preparation (prepared by extraction of wheat embryo). Administration of vitamin preparation was followed in a few hours by copious bowel evacuations accompanied by increase in appetite and ultimate recovery.

somewhat the appearance of a pouter pigeon. During 19 days' observation the temperature reached a low point of 106.4° and there was a considerable loss in weight, due undoubtedly to the impaction of the crop and the inability of the bird to consume proper food. Its comb and wattles were pale yellow in color and its excreta had a distinct oil and turpentine odor. At no time did this chicken

exhibit any symptoms of paralysis or limberneck which some observers believe to occur in the case of lead poisoning.

The addition of common salt to the mash ration fed to poultry is recommended in most poultry books, and there are no data available showing that in the proportion generally used (about 1 pound of salt to 100 pounds of the ground mash feed) there is any harmful result following this practice. Since there are cases on record of



Fig. 8.—White Plymouth Rock Cockerel. This is a photograph of a limberneck bird (see figures 1, 2 and 7), approximately five months after recovery, following the administration of a vitamine extract of wheat germ.

the death of chickens which have consumed salt in the form of rock salt, or have eaten sufficient quantities of dirt on which salt brine has been sprinkled, and the suggestion has been made that limberneck could be produced by salt feeding, we fed to three cockerels (Nos. 465, 471 and 172) 10, 20 and 30 c.c. of salt solution equiva-

lent to 3.18, 6.36 and 9.54 grams of dry sodium chloride. Chicks 471 and 172 were found dead within 8 hours after administering the salt. Chick 465 died 27 hours after being given the smaller dose of salt. All of these chicks showed marked symptoms of "air hunger." The respiration of bird 465 was 16 per minute, in contrast to 50 to 60 per minute in normal birds. There was nothing in the appearance of the birds, which resulted from the feeding of the



Fig. 9.—Single Comb White Leghorn Cockerel No. 164. This bird showed the typical symptoms of avian beri-beri or polyneuritis after subsisting on a vitamine-poor diet of polished rice for a period of 30 days. Temperature fell to 104.0, while temperatures of limberneck birds tend to remain normal (107.0). Note difference in symptoms between this bird and limberneck chickens in figures 1, 2, 3, 4 and 5.

salt, that would warrant the application of the term limberneck. The temperature of chick 465 was practically normal (107.4°).

We fed varying amounts of loose smut of barley to a few birds without any abnormal symptoms. A large amount of spoiled cottage cheese, as well as several small cream cheeses, were fed to one pen of cockerels, and the birds reacted normally. We got no evidence of poisoning or limberneck when cockerels were fed several cans of spoiled tomatoes, beans, sweet corn, and peas. These materials were obtained from a retail dealer and consisted of cans

known as "swells" in which there was a decided bulging of the ends of the cans. We were unable to obtain spoiled cottonseed or blood meal or tainted beef scrap.

Feeding Fly Larvae

Several writers on pheasant management emphasize the necessity of procuring and feeding maggots to young pheasants, and the experience of one of us (S. D. Wilkins) warrants that practice, for the birds not only grew well, but no losses were observed which could not be explained in other ways.

In order to examine this phase of the problem further, we have fed large numbers of the larvæ of the domestic house fly, *Musca domestica*, of the large blue bottle fly, *Calliphora vomitoria*, and of the green bottle fly, *Lucilia caesar*. Flies were allowed to deposit their ova on fresh beef and the larvæ which resulted were used in the feeding trials. In this manner we fed several hundred maggots from all three species, feeding as many as 700 to one chicken, and in no instance was there any evidence of an abnormal condition resulting from the consumption of the maggots.

Later we caught and introduced into the fly-proof animal cage a large number of common house flies and allowed them to feed on the carcass of a limberneck chicken. We fed the maggots which developed from the ova of these flies, and regardless of the time allowed for the flies to feed and the number of maggots fed, the results were negative with chickens and guinea pigs. We also obtained negative results when the maggots of the large blue bottle fly which had fed on the limberneck chicken were fed to chickens and guinea pigs.

On August 15 the Rhode Island Red chick shown in Figure 3 was found paralyzed in the brooder house at the University Farm. Its temperature was 106.3 degrees. There was a noticeable coryza present. The bird weighed 448 grams. The chick was killed on the afternoon of the same day and placed in the fly cage with *Lucilia caesar*. At the same time we fed two normal White Leghorn chicks on 100 flies each of the same species. Neither chick showed paralytic or limberneck symptoms after eating these flies. (White Leghorn chicks were used because they could be obtained at less cost than chicks of the heavier breeds.)

It is worthy of note that the Rhode Island Red chick which was found paralyzed had been fed and cared for in the same manner as the other chicks in the flock of more than 100. Examination of

the food given to these chicks, in the light of our present knowledge of the vitamine content of certain foods, would indicate that in this case we were not dealing with a vitamine deficiency disease. The chicks had free access to young green alfalfa and other grasses.

Saunders (24) states that White Leghorn chicks will not eat the fly maggots unless the chicks are first starved, but that Rhode Island Red chickens will consume them greedily. To this fact and to the popularity of the Rhode Island Red chicken he attributes the possibility of the spread of poliomyelitis and limberneck. In our work we have had but two limberneck chickens which were not Rhode Island Reds, and these were White Plymouth Rocks. We have not yet found a White Leghorn showing paralytic or limberneck symptoms, but we have been able to produce such paralysis by feeding the larvæ to White Leghorns.

August 21 a large male guinea pig was given two of the larvæ taken from the carcass of the Rhode Island Red chick in the fly-proof animal cage. Eight hours after being fed the two maggots the pig was paralyzed in the hind quarters to the extent that walking was impossible and at this time there was a considerable discharge at the nostrils. Two hours later the pig was dead.

A White Leghorn chick weighing 330 grams and having an initial temperature of 106.4 degrees was fed 22 of the larvæ from the carcass of the chick paralyzed on August 15. During the 10 days following this date (August 22) no paralytic symptoms were observed.

August 24 a female guinea pig weighing 356 grams was given one larva from the carcass of the Red chick at 10:45 a.m. At 8:30 p.m. of the same day this pig was unable to move the hind quarters, and it was found dead at midnight.

On August 24 a large Rhode Island Red hen showing pronounced limberneck symptoms was brought to us. Its temperature was 108.3 degrees, decidedly higher than that of birds exhibiting similar symptoms after eating polished rice for several weeks. This bird's comb was bright red, its eyes normal, and there was not the least indication of emaciation. For some time, at intervals of two days, we gave this hen 25 c.c. doses of a water-soluble extract of wheat embryo, and invariably within a few hours the body temperature dropped from $1\frac{1}{2}$ to 2 degrees. The bird still continued to exhibit convulsive seizures, especially when it was suddenly approached. This hen was killed on September 9 and an autopsy showed that it

was badly infected with a parasite which Dr. W. A. Riley, of the Division of Entomology and Economic Zoölogy, identified as an air-sac mite.

This case presents several interesting points. First, the diet of this bird consisted wholly of stale white flour bread, wheat middlings and oat flour. The bird had been kept confined at all times and got no green feed. Such a diet if continued for any great length of time would produce paralytic symptoms. Second, the high body temperature and the heavy infestation of the air-sac mites confirms McCarrison's (29) findings that avian polyneuritis associated with a high body temperature indicated a concurrent parasitic infection. Third, the maggots of the species *Lucilia caesar* grown on the carcass of this hen did not produce paralytic symptoms when fed to chickens and to guinea pigs.

On September 7 our attention was called to a hog which had died of a paralytic condition which seems to be quite prevalent over the State. This hog was similar to others that we have noted, being completely paralyzed in the hind quarters. The head of this hog was placed in a large screened cage containing a number of *Lucilia caesar* flies. On September 15 100 larvae were taken from this head and fed to a White Leghorn cockerel. Limberneck symptoms developed in a few hours, and in a short time the cockerel was dead. This is the first case of limberneck that we have been able to produce under experimental conditions. While it is known that this paralysis in hogs is quite prevalent over the State, we have not been able to obtain information concerning the dietary history or the hygienic environment of any of these hogs.

Lucilia caesar were allowed to feed on the carcass of the White Leghorn from the above case, and on September 19 213 larvæ were fed to a Rhode Island Red chick weighing 400 grams. This bird died the same day; its temperature shortly before it died was 107.2°. The head of this chick was inverted and the bird attempted to walk backwards. The legs and wings did not show any effect of muscle paralysis. The carcass was placed in the fly cage at once and *Lucilia caesar* allowed to feed. On September 26 a small White Leghorn chick weighing 250 grams was fed 200 of the larvæ. No paralytic symptoms were observed until September 30, when both legs and wings were affected. This chick ultimately recovered. At this time cooler weather made it increasingly difficult to obtain this fly in large numbers and we made no further effort to carry on the experiment.

Whether there is any connection between the finding of chick 177 (figure 4) in a limberneck condition on September 7 and the fact that a hard, steady wind blew directly from a crematory at the University Farm toward the chicken house, and that *Lucilia caesar* were found to be in the house at this time, and also that more than 20 chicks which had access to the carcasses of hogs at the crematory were paralyzed at the same time, it is difficult to determine. Chick 177 had been given 1 c.c. of a 1/1,000 dilution of *Bacillus botulinus* culture, "Strain A," on July 9, and until this date had exhibited no paralytic symptoms. The work of Buckley and Shippen indicates that the chicken may be a carrier of *Bacillus botulinus*. Our own work indicates that chickens are practically immune to inoculations of this bacillus or its toxin; therefore it is difficult to explain this case as due to the previous inoculation. The bird recovered in two days, so that we have no proof as to the causes of the limberneck symptoms.

The question may arise as to why the bird recovered so rapidly, and why other birds in the pen which had likewise been inoculated with *Bacillus botulinus* were not affected. We can only suggest that the severity of the cases of limberneck must depend upon the amount of toxic material consumed, and that other chicks were not affected because they had either consumed nontoxic flies or had eaten no flies. This one case parallels every case we have found at the University Farm, in that limberneck has appeared sporadically and not epizootically.

Observations indicated that the chicks which were feeding in the vicinity of the crematory ate appreciable quantities of the carcasses of the hogs, but there is no reason to believe that they did not also eat large numbers of the flies which were feeding on these carcasses. When the hogs were burned and the crematory cleaned there was no further evidence of paralysis among the chicks.

We realize that the number of chickens with which we have worked in this phase of the study have been small, and that there are many factors in connection with the toxic fly theory of the etiology of limberneck which we have not been able to consider in our experimental work. The fact remains that the only positive results which we have obtained in our efforts to produce limberneck in chickens have resulted from the feeding of larvæ of *Lucilia caesar* which had (previous to their consumption by the chickens) fed upon the carcasses of limberneck chickens or upon the carcasses of paralyzed animals. Pressure of other duties and lack of

assistance required that this work be terminated, for the present at least. We are therefore submitting this material in the hope that it will stimulate others to continue the work.

CONCLUSIONS

1. Limberneck symptoms are not comparable to the symptoms in polyneuritis brought about by dietary deficiencies.

2. Limberneck is undoubtedly a symptom rather than a disease.

3. It was not possible to produce limberneck symptoms in poultry by feeding and injecting the toxins produced by three different strains of *Bacillus botulinus*. The strains were toxic, however, to guinea pigs.

4. Symptoms of botulinus poisoning in chickens differed markedly from limberneck symptoms.

5. It was impossible to produce limberneck symptoms by feeding common salt, paint skins (lead poisoning), smut or spoiled meat.

6. Larvæ which developed from eggs (from *Calliphora vomitoria*, *Musca domestica* and *Lucilia caesar*) laid upon fresh beef were not toxic when fed to chickens.

7. No limberneck symptoms were observed when larvæ were fed which had developed from eggs laid by *Calliphora vomitoria* and *Musca domestica* upon limberneck carcasses.

8. Limberneck symptoms were obtained by feeding larvæ of *Lucilia caesar* which had developed from eggs laid upon limberneck carcasses.

9. Adequate diets do not protect against limberneck in poultry.

10. The body temperature of chickens falls below normal in botulinus poisoning and in polyneuritis (avian beri-beri), but this was not observed to be the case in "limberneck chickens."

ACKNOWLEDGEMENTS

In conclusion we wish to thank Dr. C. P. Fitch for his interest and assistance in obtaining the various strains of *Bacillus botulinus*, and we also desire to express our appreciation to Dr. Robert Graham, Dr. Ward Giltner and Zae Northrup Wyant for furnishing these cultures, and to Dr. W. A. Riley for assistance in the entomological phases of the work.

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LUCKY GOES TO TEXAS

To further the study of the Morgan as a saddle breed, the United States Department of Agriculture has sent the two-year-old Morgan stallion Lucky from the Morgan horse farm at Middlebury, Vt., to the Santa Gertrudis ranch at Kingsville, Texas. This is the "home ranch" of the famous King Ranch, one of the largest and best known cattle and horse breeding establishments in the United States. The Bureau of Animal Industry is paying close attention to the saddle possibilities of the Morgan horse. The King Ranch will breed Lucky to some of its high-class mares and make a careful study of the produce.

Lucky is a brown stallion fourteen and three-quarter hands high and weighs 925 pounds. He was sired by Hugo. Hugo was sired by Meteor Morgan and is out of Calve by General Gates. The dam of Lucky is Eunice by General Gates and out of Caroline by Daniel Lambert. Lucky, his sire and dam, and one of his grand dams were bred at the Government farm at Middlebury.

Morgans have always been noted for their endurance and stamina, and have been used to some extent on the range for the production of cow ponies. The outcome of this systematic study in coöperation between the King Ranch and the Bureau of Animal Industry will be watched with much interest by horse breeders.

On mules we find two legs behind,
 And two we find before;
 We stand behind before we find
 What the two behind be for.

—Lafayette Lyre.

STUDIES ON ANTHELMINTICS

X.—Stock Tonics and Some of Their Constituents

By MAURICE C. HALL and MEYER WIGDOR,

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One of us (Hall, 1917, 1918, 1919) has stated elsewhere the belief that the mineral mixtures or stock tonics commonly employed are of very little value as anthelmintics. This seems to us necessarily true. Potent anthelmintics are too toxic and dangerous to put into these preparations in sufficient amounts to be effective, because these preparations are used by persons unskilled in the handling of potent drugs. Only innocuous substances, usually reputed to be anthelmintic, and often with but little besides the reputation of being anthelmintic, can safely be incorporated in these preparations. Of the feeble anthelmintics used, iron sulphate and common table salt are the favorites. The remainder of the preparations consists for the most part of purgatives, tonics, antacids, flavor and color. We give below some tests in support of the idea that neither the mineral mixtures, stock tonics, nor the iron sulphate and salt that make up a large part of their bulk are dependably anthelmintic. These tests show that these things are not valuable when administered carefully as drugs; they will be even less effective when given in feed to stock and there would be no point to these preparations if they could not be given in feed, as they are essentially designed for this to save the trouble of dosing.

The following experiments with commercial preparations have been briefly abstracted by Hall (1919):

Commercial preparation No. 1, a well-known preparation, was given to dog No. 232, an animal weighing 10 kilos, as follows: The dog received 6 teaspoonfuls of the preparation daily—about half of the dose for a hog—for a total of 14 doses in 16 days, or 84 teaspoonfuls. The dog passed 2 ascarids, and had 10 ascarids and 93 *Dipylidium* postmortem. The treatment was, therefore, about 17 per cent effective against ascarids and 0 per cent effective against tapeworms. At this rate the ascarids would have been removed in 3 months, assuming that it removed 1 worm a week. This is an iron-sulphate and sodium-chloride preparation.

Commercial preparation No. 2 was given to dog No. 327, an animal weighing 10 kilos, as follows: The dog was first given 1

teaspoonful a day, the dose for a 100-pound hog, but as this caused vomiting, owing to the salt, which makes up 95 per cent of the preparation, the dose was cut to $\frac{1}{2}$ teaspoonful, for a total of 10 teaspoonfuls in 19 days. The dog passed no worms and had 1 ascarid postmortem. Treatment was therefore 0 per cent effective.

Commercial preparation No. 3 was given to dog No. 298, an animal weighing 14.5 kilos, at the indicated rate of 1 teaspoonful daily, for a total of 27 doses in 32 days. The dog passed 1 ascarid (after 8 treatments) and on postmortem had 15 ascarids and 18 tapeworms. The treatment was therefore about 6 per cent effective against ascarids and 0 per cent effective against tapeworms.

These experiments show that the stock tonic group has but little anthelmintic value.

To determine the anthelmintic efficacy of salt and iron sulphate the following tests were made:

Common salt was given in a dose of 1 gram in capsule followed by a small amount of water, about a half-ounce, to dog No. 325, weighing 8 kilos. The dog passed no worms and was found on postmortem to have 2 hookworms, 4 whipworms and 3 tapeworms. Treatment was 0 per cent effective against hookworms, whipworms and tapeworms.

Iron sulphate was given to 4 dogs as follows:

Dog No. 37, weighing 2 kilos, was given a 5-grain dose on each of 2 successive days, the first dose accompanied by 5 grains of calomel. The dog passed 1 ascarid and 8 whipworms, and on postmortem had 5 ascarids and 100 tapeworms. The treatment was therefore about 17 per cent effective against ascarids, 100 per cent effective against whipworms, and 0 per cent effective against tapeworms.

Dog No. 45, weighing 8 kilos, was given the same dose, 5 grains, on 4 successive days, accompanied by 2 grains of calomel on the second day. The dog passed no worms and had 1 whipworm postmortem. Treatment was 0 per cent effective against whipworms. There might have been more whipworms; this dog died from an intussusception of the ileum through the ileo-colic valve into the colon, and the specimen was kept intact.

Dog No. 44, weighing 10 kilos, was given 5 grains daily for a total of 13 doses in 18 days, or 65 grains. The dog passed no worms, and on postmortem had 20 whipworms and 11 tapeworms. Treatment 0 per cent effective against whipworms and tapeworms.

Dog No. 242, weighing 16 kilos, was given iron sulphate in doses

beginning at 5 grains the first day and increasing by 5 additional grains daily to a dose of 40 grains. The dog received 8 doses in 9 days, a total of 3 drams and an average dose of 32.5 grains. The dog passed 1 ascarid, and 1 more was found in the large intestine postmortem, and must be accredited to the anthelmintic. It also passed 3 whipworms. Postmortem there were 674 whipworms. The treatment was therefore 100 per cent effective against ascarids and less than 0.5 per cent against whipworms.

From the foregoing we may note that: Salt in the dose given is apparently of no value against hookworms, whipworms and tapeworms, but it would need further experiment to determine just how little anthelmintic value it has. Iron sulphate must be given in very large doses to be really effective against ascarids in the dog. It is of interest to recall that this drug is commonly employed against ascarids in the horse, much more difficult worms to remove. Iron sulphate shows itself effective against whipworms occasionally, but is evidently not dependable, as the results with the large doses given dog No. 242 show. It has no value for removing tapeworms. The commercial preparations—and this is true for other mineral mixtures, as one of us (Hall) has found in tests—are of but little value as anthelmintics. They may have value as appetizers or to supply mineral constituents.

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Breeder's Gazette says editorially of the opposition to tick eradication in the South: "Individual and organized hostility to the enforcement of the tick-eradication law is open or latent in a few regions of some of the Southern States; but the periodical shifting of the Federal quarantine line toward the southern boundary of the United States is a reassuring pledge that the days of the tick in this country are numbered. The Government's campaign to clean out the pest had been scientifically and economically sound. * * * If all the facts and factors were known, however, we should probably be surprised at the rapidity with which the campaign has progressed toward completion."

ANTI-BLACKLEG SERUM

By M. J. HARKINS and J. E. SCHNEIDER, *Glenolden, Pa.*

In 1893 Kitt¹ working on immunity problems on blackleg developed in sheep an anti-blackleg serum which protected sheep in 5 and 10 mil doses against fatal doses of the virulent muscle virus. In later investigation he showed that goats, cattle and horses when treated with intravenous and subcutaneous injections of muscle juice from blackleg lesions yielded a similar blood serum. Kitt's work was later confirmed by Arloing and also by Leclainche and Vallée. The latter workers extensively used the immune serum alone and in combination with various preparations of the bacillus of blackleg or its products, with remarkably good results. Where deaths from blackleg were reported following the use of the immune serum alone as an immunizing agent they were possibly because the period of immunity following the administration of the serum was not known and the deaths probably occurred when very little or any of the passive immunity existed.

The work here reported is contributed to show the possibility and value of a laboratory test on anti-blackleg serum which may serve to standardize various lots of serum.

The serum was produced in horses by the subcutaneous injection of cultures of the bacillus of blackleg containing toxin, which were fatal for cattle in 1-mil amounts, and the natural aggressin. The two products used in the immunization of the animals were injected alternately 7 days apart. The treatment extended over a period of 20 months. The animals were bled on an average of once every 10 days; the serum was collected from each bleeding and mixed in lots approximating 100,000 mls. Each lot was subjected to the following test:

Protection test.—Six guinea pigs, each weighing 400-450 grams, were used for each lot of serum. Guinea pigs of this weight are more susceptible to blackleg than the smaller 200-300 gram animals, and for this reason were used. Each guinea pig was injected intraperitoneally with 2 mls of the immune serum, and 24 hours later subcutaneously with 6 milligrams of powdered cattle virus suspended in 1 c.c. of physiological salt solution. It was found that this amount of muscle virus would kill normal guinea pigs within 96 hours. At the same time 6 guinea pigs were treated in a similar

¹ Hutyra and Marek. Pathology and Therapeutics of the Diseases of Domestic Animals, vol. 1, p. 58.

manner with normal horse serum and powdered cattle muscle virus, and 16 normal guinea pigs received the muscle virus alone. The animals were observed for 96 hours after injection of the muscle virus, and those alive at the end of that time considered survivals and the test finished.

Details of Tests

Serum No.	Guinea pigs injected	Serum injected intraperitoneally	Virus injected subcutaneously after 24-hour interval	Per cent survived
5685.....	6	2 mils	6 mg.	100
84501.....	6	2 mils	6 mg.	100
84502.....	6	2 mils	6 mg.	100
84500.....	6	2 mils	6 mg.	100
85466.....	6	2 mils	6 mg.	100
82721.....	6	2 mils	6 mg.	83.33
90791.....	6	2 mils	6 mg.	100
82996.....	6	2 mils	6 mg.	100
84444.....	6	2 mils	6 mg.	100
87044.....	6	2 mils	6 mg.	100
90792.....	6	2 mils	6 mg.	100
91247.....	6	2 mils	6 mg.	100
6000.....	6	2 mils	6 mg.	100
Controls, normal serum.....	6	2 mils	6 mg.	16.66
Controls, muscle virus.....	16	0 mils	6 mg.	18.75

Of the anti-blackleg serum guinea pigs surviving, of which there were 100 per cent in each lot except one (82721) in which one animal died, no other deaths occurred within 14 days. The one surviving normal-serum guinea pig (16.33 per cent) also lived for 14 days. But of the 18.75 per cent muscle-virus controls that survived 96 hours, all died of blackleg within 7 days after injection of the muscle virus, and at the time the test was considered completed (96 hours) showed enormous swellings at the site of injection with exudation of serous fluid and ulceration. Quite a contrast was presented by the anti-blackleg-serum guinea pigs, a few of which showed only a slight edematous swelling within the first 24 hours, which rapidly subsided.

The general health of the anti-blackleg-serum guinea pigs was not impaired in the least as a result of the test. With reference to the use of muscle virus as an infective agent, in our experience it has proved better than either the culture or the edematous fluid from an infected guinea pig.

SUMMARY

1. The protection test, consisting of the injection intraperitoneally of 2 mls of anti-blackleg serum followed in 14 hours by the subcutaneous injection of a fatal dose of blackleg muscle virus, gave consistent and uniform results.

2. Anti-blackleg serum protected 100 per cent of the guinea pigs injected in 12 or 13 lots tested. In the remaining one lot 83.33 per cent of the guinea pigs injected were protected.

3. Normal horse serum, subjected to a similar test on guinea pigs, did not afford protection against a fatal dose of blackleg muscle virus; only 1 of the 6 animals survived.

4. Blackleg muscle virus proved an efficient agent in the tests.

5. The tests show that the serum tested is high in antibody titre and that passive immunity is imparted to the animal injected to enable the animal to withstand infection of a fatal dose administered 24 hours later.

The Westminster (Md.) *Times* reports the good work of a local veterinarian in this wise:

"Our veterinarian, Dr. H. M. Keller, got a hurried call on Saturday evening to the home of Clinton Garvice tenant on the Dr. Keagy farm near the Mason and Dixon line in Maryland not far from Nace's Mill. He at once made a hurried run to the home where two cows were dead and others dying with every symptom of poison. After findout out the cause he at once set to work to save a fine bull that with locked jaws but with hyperdermics he got the saliva to run freely to which the jaws unlocked and with antidote remedies he saved the bull and five cows."

Pictures of cows of the twenty-sixth century before Christ, found on Egyptian monuments, and pictures of Assyrian horses have been made into stereopticon views by the United States Department of Agriculture, together with pictures of present-day animals for purposes of comparison. These slides have been prepared as a part of a series on better live-stock production for use in the "better sires" campaign. The ancient animals, of course, do not conform to modern standard classifications, but judged on general appearance they would outclass a great many American scrub animals of today.

Breeder's Gazette says of the accredited herd work: "The advantages of the accredited herd are so many that they more than overcome the few inconveniences. It is getting easier to buy cattle from Federal-tested herds as they are getting so much more numerous."

ROSE-CHAFER POISONING IN CHICKENS

By B. A. GALLAGHER, *Washington, D. C.*

Extensive losses among chickens, generally attributed to other causes, result from eating rose chafers which invade certain sections of the country during the latter part of May, June and early July. Several cases of rose-chaffer poisoning have recently been observed in young chickens submitted to the Pathological Laboratory of the Bureau of Animal Industry for examination. In these cases the losses reported ranged from 25 chickens in one flock to 85 in another. Reports of similar outbreaks, however, indicate that the mortality from this cause may run much higher, depending upon the number of birds exposed.

APPEARANCE, DISTRIBUTION, HABITS

The rose chafer or "rose bug" (*Macrodactylus subspinosus*) is a light ocher or yellowish brown colored beetle about one-third of an inch in length, and has long, spine-covered legs. It is found in the area extending from Canada to Virginia, Tennessee and Oklahoma, and from the Atlantic coast to Colorado. These beetles usually appear suddenly late in May or early in June in the southern part of their range and about two weeks later in northern regions. Their coming corresponds rather closely to the time of blossoming of various garden flowers. They disappear about a month or six weeks after their arrival. Some years rose chafers are much more abundant than in other years, and work great havoc on vegetation, especially on vineyards.

Nearly every form of vegetation is attacked, blossoms, leaves and fruit being consumed. The chafers feed on roses and other garden flowers, ornamental plants, shade trees, shrubbery, grapes and other garden fruits, many garden vegetables, corn, wheat and grasses, also on various weeds and wild plants.

LIFE HISTORY

One generation of rose chafers is produced annually. The length of life of an individual is about 3 weeks, and during this time the male and female are almost constantly paired. The female deposits an average of 30 eggs from one-fourth of an inch to 4 inches below the surface of the ground, usually in sandy soil. The eggs are deposited singly in the walls of small burrows. Larvæ hatch in from 2 to 3 weeks, appearing as yellowish white grubs with

brownish heads. These feed upon the roots of plants until late in autumn, when they burrow deeper in the ground below the frost line. In the following spring they return to near the surface and transform to pupæ. After 2 to 4 weeks the pupæ transform to beetles, which pass out of the soil, mate, and begin feeding on the surrounding vegetation.

SUSCEPTIBILITY OF CHICKENS

Reports of outbreaks, and experiments carried out by Lamson, indicate that chickens over 10 weeks old are not killed by feeding on the insects, although symptoms of poisoning are sometimes produced. Lamson states that from 15 to 20 rose chafers are sufficient to cause the death of a chicken 1 week old; from 25 to 45 are necessary to kill a 3 weeks old chicken, and that 96 killed a 10 weeks old chicken. Apparently the poisonous effect of the insect varies, as autopsies conducted by the writer on chickens ranging from 2 to 8 weeks old disclosed not over 10 rose chafers in the crop of any chick, and as few as 2 insects were found in the crop of an 8 weeks old chick which died from this cause. When rose chafers are numerous, however, chickens will devour large numbers and the crop may be distended and present the appearance of "crop bound."

That deaths are due to the poisonous nature of the insects rather than to mechanical interference is proved by Lamson, who found that a filtered watery extract of crushed rose chafers fed to chickens produced death in the same manner as the insects. When injected into the veins of rabbits in 2.5 c.c. to 4 c.c. doses, the extract caused death in from 55 seconds to 6 minutes. Lamson believes that the poisonous principle is a neuro-toxin which has an effect upon the heart action.

SYMPTOMS

Symptoms may appear as early as one hour after feeding on the beetles. The affected bird becomes drowsy, shows weakness of the legs, and falls over on its side. There may be convulsive movements. Sharp cries are frequently emitted, and retraction of the head and neck over the back of the chicken is quite characteristic. Deaths occur in the period up to 24 hours after eating rose chafers. In the outbreaks observed by the writer deaths followed in from one-half to 1 hour after symptoms were observed. If a sufficient amount of the poisonous principle to produce death is not absorbed the symptoms disappear.

POSTMORTEM APPEARANCE

On autopsy the affected birds fail to show changes in appearance of the alimentary tract or other internal organs, other than an injection of the blood vessels of the heart wall in a minority of the cases. The only diagnostic clue presented is the presence of rose chafers in the crop. These appear darker in color than when observed in the free state, owing to the action of the crop contents on the yellow pigment of their bodies.

TREATMENT

The rapid action of the toxin renders treatment unsatisfactory in birds showing symptoms. An effort, however, may be made to reduce the mortality by administering a purgative to all exposed chickens of the flock as soon as the nature of the trouble is realized. Teaspoonful doses of castor oil containing 15 drops of turpentine would be indicated and may also be given to birds showing symptoms. In a large flock, however, individual treatment would be too slow and tedious, hence the use of Epsom salt would be advisable. This should be given in the proportion of one-fourth of a teaspoonful to each bird under 10 weeks old. The total amount of salt necessary is dissolved in water and mixed in the amount of mash which the flock will readily consume.

PREVENTION

During the period when rose chafers are present young chickens may be kept in inclosed runs or at points where they will not have access to grape vines, rose bushes, shrubbery, vegetables and other flowering plants infested by the insects.

Arsenate of lead and Bordeaux mixture thoroughly sprayed on vines, bushes, etc., before the blossoms appear, and once or twice while the beetles are present, will do much to destroy the pest and prevent serious injury to plants and chickens.

The rose chafer while in the pupal stage may be readily destroyed by plowing and harrowing infested soil during May in the southern range of the insects, and during the latter part of May and early June in their northern range.

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DR. E. I. SMITH—AN APPRECIATION

Dr. E. I. Smith, Inspector in Charge of Tick Eradication work in Louisiana for the past five years, has been transferred to Hartford, Conn., to be in charge of tuberculosis eradication in that section of the country.

The severance of Dr. Smith's connection with the work in Louisiana is very much regretted by his fellow workers as well as by members of the State Live Stock Sanitary Board with whom he was brought into such intimate relations.

Through his untiring efforts, Dr. Smith has built up a force, both field and office, of which he may be justly proud, not that he may gain thereby any personal glory, but to the end that the work in general might be more easily and more expeditiously accomplished. The Doctor's first thought has ever been in the interest of his co-workers; ever trying to better their conditions in every way possible.

As a token of esteem, therefore, and to show their appreciation of their chief, the force under Dr. Smith took occasion, on June 29th, the eve of his departure for his new field of endeavor, to surprise him by presenting him with a handsome gold watch and gold fob inlaid with a diamond, the latter being the personal gift of Dr. E. P. Flower, Executive Officer of the State Live Stock Sanitary Board, with whom he had been so closely affiliated in the work of tick eradication in Louisiana.

The watch was the gift of Dr. Smith's official family, and the presentation was made by Dr. E. J. Meixel, Dr. Flower himself presenting the gold fob.

The Louisiana State Live Stock Sanitary Board, through Drs. Dalrymple and Flower, also contributed to the main gift.

Dr. Smith, who was taken entirely by surprise, was very much affected by the thoughtfulness and appreciation of his friends, which they had expressed in such a handsome manner, responded in a most feeling way, but with considerable difficulty, owing to the circumstances which prompted the occasion.

W. H. D.

BACILLUS BULGARICUS IN THE TREATMENT OF INTESTINAL TOXEMIAS OF DOGS¹

By O. A. LONGLEY, *San Francisco, Calif.*

Cases of intestinal toxemias constitute a large percentage of the practice of veterinarians engaged in treating small animals, therefore any factor bearing upon successful treatment should be of interest.

The symptoms presented as the result of overfeeding and lack of exercise, especially in small house dogs, are so common and familiar to veterinarians that there is no need of reviewing them here. The symptoms presented vary and are usually accompanied by either constipation or diarrhea. Treatment usually consists of a laxative, antiferments, carminatives, emollients, and various mixtures intended to correct or stimulate digestive processes, all of which are used with varying results.

Conclusive clinical evidence indicates that the symptoms presented are caused by the absorption of toxic products resulting from the action of putrefactive bacteria in the intestinal tract. Extensive bacteriological processes are going on all the time, which is shown by the fact that, after drying, about one-fourth by weight of the feces of a dog in normal health consists of the bodies of bacteria. Of the various species of bacteria inhabiting the intestinal tract, fully one-third are putrefactive organisms which act upon protein food. During the process of normal intestinal digestion the protein molecule is broken down by the digestive enzymes into amino-acids which are absorbed and assimilated. When, however, the growth of putrefactive bacteria in the intestine is excessive, the amino-acids are decomposed into products that may be and often are toxic in character. If the production of such toxic products is continued for any length of time, normal resistance is overcome and the various symptoms, more or less serious in character, are presented.

Rational treatment therefore should consist of removing the cause by inhibiting the growth of putrefactive bacteria without further lowering the vitality of the patient. This can be accomplished by the administration of *Bacillus bulgaricus* in pure culture.

It has long been known that the growth of certain organisms will inhibit the growth of others. This fact has been practically applied

¹ Paper presented at meeting of California State Veterinary Medical Association, Los Angeles, June 17, 1920.

in clinical medicine by the use of *Bacillus bulgaricus* to prevent the development and activity of putrefactive bacteria in the intestinal tract. This method of treatment is being used by many veterinarians, who report more prompt and satisfactory results than have heretofore been obtained by the old-line treatments.

Putrefactive bacteria do not thrive in an acid medium. *Bacillus bulgaricus* is harmless to the patient, and produces about 3 per cent lactic acid during its growth and multiplication, which is also harmless. The therapeutic value of *Bacillus bulgaricus* is therefore readily recognized in the treatment of cases arising from the absorption of toxic products by the growth of pathogenic bacteria which create putrefaction in the intestinal tract.

Bacillus bulgaricus is a strong individual and thrives well in the intestines. It is claimed that it exerts a favorable influence in destroying putrefactive bacteria other than by the production of lactic acid. Metchnikoff has shown that putrefactive bacteria will not multiply in the presence of the actively growing *Bacillus bulgaricus*, as conditions are produced that are unfavorable to their growth.

DOSAGE

One teaspoonful (4 or 5 c.c.) constitutes an average dose. In acute affections a dose should be given every one or two hours until definite improvement is noted, after which a dose three or four times daily will suffice. Sufficient should be given to bring about an excess of *Bacillus bulgaricus* in the intestinal tract, for thereby the most prompt and satisfactory results will be obtained. Since *Bacillus bulgaricus* is nonpathogenic, large doses of the culture may be administered at frequent intervals without any untoward effect.

Bacillus bulgaricus in pure culture is marketed in liquid form in a special medium that insures its viability for a period of about six weeks, each package being clearly stamped with the date after which it should not be used. To maintain its uniform activity and insure full therapeutic value during this period it should be kept cold, preferably in a refrigerator. Two styles of packages are available—a 3-ounce bottle and a package consisting of twenty 5 c.c. vials or tubes, each tube constituting a dose.

Dr. David Warnock is now Deputy Minister of Agriculture for the Province of British Columbia and any communications addressed to him at Victoria, B. C., will be safely delivered.

TRAUMATIC INDIGESTION AND PERICARDITIS IN CATTLE¹

By C. H. STANGE, *Ames, Iowa.*

It may seem that the subject of this paper really includes two separate and distinct conditions. To a certain extent this is true, but inasmuch as it is desired to draw especial attention to a few of the most important factors concerning traumatic pericarditis, it is not possible to eliminate the subject of indigestion. These conditions, while not of the same significance as some of our infectious diseases, which are responsible for enormous economic losses every year, are nevertheless sufficiently prevalent among milch cows to warrant your attention for a few moments.

The pathology of this disease will not be especially considered in detail, and only those changes will be mentioned which have a bearing on the symptoms. My reason for approaching the subject in this manner is because, while the pathology is interesting, it is nevertheless very much more important in such cases that we be able to recognize the disease in its earliest stages, when traumatic indigestion is leading to pericarditis, as I am assuming in this paper; for, unless early diagnosis can be made and some satisfactory relief given, there is nothing left, in most cases, except a carcass and a bill for services rendered.

CAUSES AND LESIONS

While both sharp and dull objects are frequently swallowed by cows, I shall limit myself to those which penetrate the wall of the stomach and produce injury to it as well as to neighboring structures; therefore objects such as wire, nails, pins, etc., should be kept in mind in this connection.

While penetration of the wall of the reticulum, which is the compartment almost invariably concerned, takes place, the nature of the injury resulting depends to a large extent upon the character of the foreign body and the rapidity with which it is progressing in the tissues. If blood vessels of considerable size are severed there will be sufficient hemorrhage to be of diagnostic value when the feces are examined. Usually when the serous membrane is reached, peritonitis, usually localized, results and adhesions take place. Further penetration into the diaphragm leads to inflammation of the

¹ Paper presented at the Twenty-third Annual Meeting of the Minnesota State Veterinary Medical Association, St. Paul, Minn., January, 1920.

diaphragm. Advancing forward, the object proceeds immediately to the pericardial sac, producing an inflammation of this structure. The progress of the object may be so slow that acute symptoms may not develop until the last stages. The nature of the infection carried by the foreign body will determine, to a large extent, the degree of inflammation. It is readily apparent, therefore, that the path of the foreign body may quite easily be traced by the inflammatory processes which later develop into connective tissue structures.

DIGESTIVE DISTURBANCES

The most common symptoms of traumatic indigestion are those of gastro-phrenitis caused by sharp foreign bodies penetrating the wall of the reticulum and diaphragm.

The usual clinical feature is somewhat as follows: Without any apparent cause, digestive disturbances suddenly appear which frequently resemble the symptoms in intestinal invagination, accompanied by acute colicky attacks, striking at the abdomen, tramping back and forth. In other cases there may be simply symptoms of acute catarrhal gastritis. Following this there is usually a series of more or less chronic periodically recurring gastric disturbances of a very changeable, inconstant character, in which chronic tympanitis plays a leading part and which is of great diagnostic significance. Furthermore, it does not yield to any of the accepted treatments for indigestion.

The points of principal diagnostic value are as follows: The animal at times shows quite marked indications of pain, manifested by groaning, especially following feeding, while lying down, while getting up, uneasiness, and tendency to lie down when being driven. The movements are cautious and performed with a degree of tenseness. The countenance reveals anxiety and pain. The attitude indicates pain, as shown by humped back, turning out of the elbows, pain on palpation over the reticulum and not infrequently over the rumen. If the inflammation of the diaphragm is more or less acute, palpation over the loin and border of the ribs where the diaphragm attaches will be painful. The same condition makes inspiration, and generally any movement, painful, and is usually accompanied by groans. On account of pain the animal dislikes to strain, which frequently leads to constipation, and, as already indicated, the feces should always be examined for internal hemorrhage. The movements of the rumen in most cases are usually quite limited, and this leads to tympany.

While the objects may pass in other directions and not produce pericarditis, the latter is most frequent and is the one under consideration here. We have, however, found foreign bodies in the liver, lungs and other structures.

CARDIAC SYMPTOMS

At the beginning the heart beat is strengthened, palpitating, bounding, and frequently so tumultuous that it may be heard three or four steps from the animal. Frequently there is a secondary beat, not unlike an echo. Later, especially if considerable exudate is present, the heart beat becomes almost imperceptible. Percussion in the region of the heart is painful and, depending upon the quantity of the exudate, reveals an area of dullness of varying size. If the inflammatory process of the pericardium is still in its first stages, friction sounds may be heard; later the fluid produces splashing sounds which vary greatly.

RESPIRATORY SYMPTOMS

The compression of the auricles together with the weakening of the heart leads to passive congestion of the lungs and increased respiratory frequency, causing dyspnea, which is much exaggerated by exercise. These symptoms may become more or less prominent and should not lead one to overlook the essential cause of the difficulty.

JUGULAR VEINS

The same cause of passive congestion of the lungs leads to the filling of the jugular veins and a venous pulse. As this develops, edematous swellings may appear along the neck, and, if the head is lowered much, about the head, and may later involve other dependent portions of the body. This symptom is quite characteristic of traumatic pericarditis.

GENERAL SYMPTOMS

The irregularity and irritable condition of the heart of course is noticeable in most cases in the pulse, which becomes very frequent, weak and often thready. The temperature is variable; it may go up to 105 or 106. Temperature of the surface of the body is changeable. Some regard this as having considerable significance. Symptoms in the later stages become very grave and include, in addition to those already enumerated, a marked disinclination to move, cyanosis, edema, and in some cases indications of pyema. Parturition usually aggravates all the symptoms.

TREATMENT

Treatment, of course, is unsatisfactory, so far as medicinal agents are concerned. An early diagnosis is important in order that it may be determined early in the course of the disease whether slaughter is advisable or surgical operation should be attempted.

In a few cases it is possible to remove the foreign bodies by surgical procedure and bring about recovery. I wish to describe briefly one case which was operated upon with satisfactory results. No doubt many other cases could be treated in the same manner, provided a diagnosis is made in the early stages and prompt action taken. The patient was a Holstein cow on the college dairy farm. She was at the height of her milk-producing period. A call came to the Veterinary Division the day after the first noticeable symptoms of indigestion became apparent. Respiration and temperature were normal. The pulse was 90 and quite marked in the jugular furrow. Animal refused food. Two days later the respirations were 18, temperature 102.1, pulse 108. The heart beat was tumultuous and could be heard several steps from the animal and felt by placing the hand upon almost any part of the body. There was quivering of the muscles back of the elbow, which, by some, is regarded as diagnostic. There was considerable edema, especially in the jugular furrow. It was decided that any operation which gave promise of success at all was justified, because drugs were useless and any other measures without hope.

The operation was performed with the animal in a standing position, and rumenotomy was carried out according to the accepted procedure. The hand was introduced into the rumen, and by following the wall of the rumen downward and forward the reticulum was entered, and a careful examination of its anterior surface revealed the presence of a nail which was buried in the tissues practically up to its head. It would seem that such an object would be hard to locate, but inasmuch as the lining of the reticulum is rather loosely connected to the muscular coat, and is quite movable, the attached point produced by the entrance of the nail was readily located. After removal of the nail complete recovery took place. The most unsatisfactory part was the difficulty in securing healing of the rumenotomy wound.

In beef or grade dairy animals in good condition it may be advisable to slaughter. The principal object of this paper is to emphasize the necessity of an early diagnosis and prompt steps, either in the form of an operation or slaughter.

URTICARIA¹

By H. G. MCGINN, *Aitkin, Minn.*

Urticaria is a disease of the skin characterized by the development of wheals or patches which appear and disappear suddenly and are accompanied by great itching and burning. The eruption may take the form of papules (*urticaria papulosa*), vesicles (*urticaria vesiculosa*), or may be associated with hemorrhage (*urticaria hemorrhagica*), a condition found in the cutaneous form of hemorrhagic septicemia of the various animals. Urticaria associated with great subcutaneous or submucous edema is regarded as a form of giant urticaria in which the edematous swellings cause no particular symptoms unless in the larynx would produce dyspnea or if in the intestines would produce either vomiting, colic or diarrhea.

The wheals above mentioned are caused by capillary dilation and serous exudation in the corium (skin) and stratum mucosum (or four layers of the epidermis, s. corneum, s. lucidium, s. granulosum, s. mucosum). Generally urticaria is manifested by sharply defined flat, raised swellings of the skin, the result of a quickly occurring serous transudation in the papillary bodies of the corium. It is therefore regarded as a circumscribed edema of the skin which has only reached the point of exudation of serum and not of infiltration with cells. The rapid disappearance of the rash is probably due to resorption of the serous fluid. The cause of the transudation of fluid is due to a sudden dilatation of the capillaries, thereby producing an abnormal excitement of the peripheral vaso-motor nerves which may be due to skin irritation or may be of internal origin.

Urticaria causes neither the formation of abscess nor the swelling of glands; the tumors produced are benign. The causes of this condition may be either external or internal. Among the external causes may be the application of some irritating substance upon the skin, such as turpentine, etc., or it may be caused by the sting or bite of insects. As to the internal causes, it is probably due to some disturbance of the vaso-motor nerve system caused by some irritant taken into the blood which has a peculiar effect upon the skin. In disturbances in the intestinal canal certain abnormal products of decomposition and digestion (toxins) are absorbed by the blood and excreted by the skin; producing inflammation. In certain animals, especially in young, full-blooded, well-fed animals, there

¹ Paper presented at the Twenty-third Annual Meeting of the Minnesota State Veterinary Medical Association, St. Paul, January, 1920.

seems to be an individual susceptibility to the action of certain foods which may be supposed to cause urticaria. Among the exciting causes may be mentioned shedding of the coat, sudden changes in the weather, unwholesomeness or sudden change of food, and rapid cooling of the skin when the body has been overheated. It therefore occurs in the spring and summer, following exhausting labor or rapid movement. In such cases it is due to retention in the body of injurious matter as result of chill, rather than by direct influence of the same upon the skin. In a great many cases it is impossible to attribute the occurrence of urticaria to any specific cause.

SYMPTOMS

The symptoms are characterized by the rapid appearance of a flattened, elevated patch upon the skin, which in the course of a few hours will spread over a large area. At first the patches are isolated, and over them the hairs appear rough. These patches multiply and form quickly and often coalesce, forming large swellings, giving the animal a very unsightly appearance. These swellings appear upon the neck, shoulders, flank, buttocks, and in some cases the limbs, thighs, head, etc., are affected. This condition is chiefly important in connection with the horse because it may change the color of the hair and leave a dark skin spotted with gray or white hair, especially in cases of ten days or so standing. The swellings are sometimes met with in the visible mucous membranes of the mouth, nose and vagina. Their appearance in the mouth leads to disturbance of mastication; in the nose to a disturbance of respiration, and in the vagina to difficulty of urination.

Other disturbances of the general health are symptoms of slight fever, weariness, depression, and disinclination to move about or work. Symptoms of gastro-intestinal catarrh, loss of appetite, diarrhea and constipation are observed, as well as outbreaks of sweating. In some cases the eruptions vanish as quickly as they appeared, say in 24 to 48 hours. Some animals are prone to several attacks in one year.

It is quite evident that urticaria in the majority of cases is merely a symptomatic exanthema and should be cited only as an accompanying symptom of the particular disease with which it is associated, as it is often the only visible phenomenon and the internal complaint can not in all cases be positively demonstrated.

DIFFERENTIAL DIAGNOSIS

Urticaria may be confused with various other affections of the skin, such as eczema, because this term is now applied very generally to eruptions of all kinds that depend on internal disorders or constitutional conditions and that tend to recurrence. The symptoms of eczema are characterized by the formation of blisters which break and discharge a straw-colored fluid, and the location is usually the limbs, although the eruption may appear on any part of the body. In pruritis there is a tendency toward the formation of pimples, vesicles or abrasions, especially about the roots of the mane tail.

Herpes, another condition of the skin, is characterized by the formation of vesicles in clusters or groups with little tendency to break, but dry up into fine scabs. The duration of these eruptions is of longer standing than in true urticaria.

Erysipelas, which is a specific contagious disease caused by a bacterial poison, is characterized by spreading dropsical swellings of the skin, and is attended by general fever.

Purpura hemorrhagica, an acute infective disease, the cause of which is unknown, may be characterized by the petechial spots occurring on the mucous membranes of the mouth, eye and nostrils. This condition is usually a sequel to some previous attack of influenza, etc., although it may occur in the absence of any previous disease, from causes such as being in poorly ventilated stables, among poorly fed animals, or in horses subject to exhausting labor.

TREATMENT

Treatment is usually superfluous. In many cases fasting and warm covering suffice. In cases of any gastric or intestinal disturbance, treatment should consist of purgatives, daily doses of artificial Carlsbad salts, fasting or cutting down on the daily ration, as well as the application of an astringent solution to the swellings.

Dr. George Hilton, Chief Veterinary Inspector of Canada, has just completed a lengthy visit in the Canadian Western Provinces. He reports that in their mange area, where the compulsory dipping has been in progress, all cattle have been dipped twice. All the dipping solutions have been carefully prepared and the cattle were put through at a temperature ranging from 110 to 120 degrees Fahrenheit. Therefore no serious trouble in future with this disease is anticipated.

TUBERCULOSIS CONTROL IN PENNSYLVANIA¹

By SAMUEL E. BRUNER,

*In Charge of Tuberculosis Control Division, Pennsylvania Bureau
of Animal Industry, Harrisburg, Pa.*

Koch isolated the tubercle bacillus in 1882. Ten years later Dr. Leonard Pearson applied the first tuberculin test in the United States on a herd in Pennsylvania. The Pennsylvania Live Stock Sanitary Board, now the Pennsylvania Bureau of Animal Industry, was created in 1895. From 1896 to January 1, 1920, there were tested under its supervision 746,248 cattle, of which 36,577, or 4.7 per cent, reacted. This does not include herds tested under the officially accredited plan. The cattle tested may be divided into six classes, as follows:

1. Imported into Pennsylvania.
2. Sold into other States and intrastate movement.
3. Certified dairies, herds to comply with municipal ordinances, and private milk companies.
4. Owners who desired to test one or more animals. Subsequent tests, if made, applied at irregular intervals.
5. Breeders who desired to establish tuberculosis-free herds.
6. State institutions.

The results obtained varied according to the class of cattle tested. Our bureau regarded tuberculosis eradication as a practical and economic proposition prior to the adoption of the officially accredited plan. This is proven by the results obtained under the direct supervision of the Pennsylvania Bureau of Animal Industry in the herds at State institutions, as well as in a large number of privately owned herds.

In order to accomplish satisfactory results, considerable difficulty was experienced in certain of these herds. For a number of years it was thought that one subcutaneous test was sufficient to remove all diseased animals from an infected herd. Actual results obtained in a large number of herds tested indicated that one test was not sufficient to detect all reactors. From experiments conducted by the Pennsylvania Bureau of Animal Industry, it was found that a tuberculous animal was tolerant to tuberculin one day, while at a subsequent date this animal would react, even with a minimum dose of

¹ Paper presented at the annual meeting of the Pennsylvania State Veterinary Medical Association, Harrisburg.

tuberculin. This may account for the occasional apparent inefficiency of the subcutaneous test. It was difficult to arrive at the percentage of those which passed a successful test, but on autopsy revealed visible lesions; and owing to the high percentage of reactors which showed no visible lesions on autopsy, it was decided in 1912 to increase, if possible, the efficiency of tuberculin tests; in other words, how to test properly and effectively herds which as the result of the first test showed more than 10 per cent diseased, also herds in which reactions continued to occur on subsequent tests.

The experimental work referred to, conducted by our bureau with the satisfactory results obtained in herds tested in the field, demonstrated the value of the combination test as a practical proposition in tuberculosis control. Had the combination test not been applied on herds maintained at State institutions and in many privately owned herds, those herds would not be free from tuberculosis today. Although we have used the combination test in Pennsylvania since 1912, we do not, however, want to leave the impression that the subcutaneous method alone has not in many instances freed herds from tuberculosis and kept them clean. But the combination tests are necessary and are indicated in a certain class of herds, in order to obtain the best results.

As a concrete example, a herd of 100 cattle was tested by the subcutaneous method, when 39 reacted and 13 were suspicious. The balance of the herd, including calves and suspects, or a total of 74 animals, were retested with subcutaneous, ophthalmic and intradermal tuberculin. The 13 suspects reacted, also 21 others that were negative to the initial test. All but 4 were slaughtered, and all showed lesions.

There are times when the combination test is of little value, but this is the exception and not the rule. To show the efficiency of the subcutaneous test, recently a herd consisting of 19 animals was tested by the subcutaneous method, and 12 reacted. A combination test applied to the balance of the herd, or 7 animals, showed that they were negative to all three tests.

Combination tests are indicated (1) when an initial test reveals a large number of reactors; (2) when retesting suspects, as well as cattle that have received several injections of tuberculin within a short period; (3) herds which have been retested a number of times and one or more tuberculous animals are removed after each test; (4) retesting additions to herds, especially animals which originate in herds where a large number of reactors are obtained;

(5) where it is impossible to obtain any history of the herd from which the added animal came.

The efficiency of the ophthalmic and intradermal tuberculin seems to be increased when used in conjunction with subcutaneous tuberculin. There are instances, however, when ophthalmic and intradermal tuberculin can be used alone to good advantage. It was observed, while carrying on this work, that many animals (calves) too young to inject with subcutaneous tuberculin at the time of initial test, would, when they became old enough to test, react to subcutaneous tuberculin. It was then decided to subject the calves, regardless of age, to the intradermal and ophthalmic tests at times of applying the initial subcutaneous test to the mature cattle.

The results obtained in many herds demonstrated that the combination retest can be applied safely and effectively seven days after the initial test. We might add that the seven-day retest was used in eradicating the disease from a number of State institution herds, also from a number of privately owned herds, where reactions were obtained in subsequent tests. These herds have since passed at least two successful annual tests.

As an example of the value and efficiency of the seven-day retest, our bureau recently received a report covering a tuberculin test of 9 animals sold into another State. The subcutaneous test showed 4 positive reactors. The balance were regarded as more or less suspicious. A seven-day retest was applied, using the combination test, with the result that all suspects reacted to one or more of the tuberculins. In addition to the efficiency of the seven-day retest in this case, our bureau was able to give the owner an early decision regarding shipment. Furthermore, it enabled the bureau to detect earlier and to remove more promptly the diseased animals that escaped the initial test. It was also a great advantage to the owner, in that he was not obliged to feed diseased cattle for so long a period.

The officially accredited plan does not permit a seven-day retest. Retests under the plan can not be applied within 60 days.

Usually the combination test is applied in the following manner: Intradermal tuberculin is injected in the left caudal fold. At the same time the eye is instilled with a 4 per cent ophthalmic solution or one ophthalmic disc. The first intradermal reading is observed 43 hours after injection. Seventy-two hours after injection, or the third day, the second reading is made. On this third day the usual number of preinjection temperatures is taken in connection with the

subcutaneous test. The subcutaneous tuberculin is now injected, using double the amount used for the initial test. Following the subcutaneous injection the same eye that received the 4 per cent ophthalmic solution or one ophthalmic disc is instilled with an 8 per cent ophthalmic solution or 2 ophthalmic discs. Subcutaneous test is resumed. The first post-injection temperature is taken at the third hour following the injection, the second at the sixth hour, and then continued at regular two-hour intervals up to and including the twentieth hour. Following each temperature measurement the eye is observed. The caudal fold is observed again at the ninety-sixth hour.

Previous to April, 1918, when testing under the officially accredited plan was begun, approximately 600 herds were under State supervision. The State plan contained practically the same requirements as the officially accredited plan. The principal difference was that under the State plan all tests were made by the local practitioners at the owners' expense. This State plan was discontinued July 1, 1919, except where the owner desired to continue the plan. About one-third, or 200 herd owners, who were working under State supervision have changed over to the officially accredited plan.

Another phase to tuberculosis eradication is the Bang method. It has been tried in Pennsylvania and found practical, especially in purebred herds. Unless the reacting animals are above the average in value and production, it is usually more economical for the owner to slaughter than to segregate with the idea of raising calves. Its practicability was first demonstrated at the Pennsylvania State Farm in Delaware County. A large number of owners have successfully kept one or more animals under this method. At present there are five Bang herds in Pennsylvania.

Pennsylvania had so many interests other than live stock, such as manufacturing, mining, etc., that the breeding and raising of cattle has been more or less neglected. In other words, we have been a buying and not a selling State. This has been detrimental to the tuberculosis eradication work in Pennsylvania. An average of 25,000 cattle for dairy and feeding purposes are imported each year. Last year (1919) seems to have been a banner year in this respect, for 35,547 cattle were imported for purposes other than slaughter. More purebred cattle were imported into Pennsylvania during 1919 than in any previous two years. More than 3,000 cattle are exported each year for dairy and breeding purposes. Imported cattle naturally originate in all kinds of herds. As a rule an

owner in disposing of excess cattle retains the best. Newly acquired cattle that have not been isolated and subjected to at least two successful tuberculin tests have been the means of infecting many healthy herds.

In comparing the results in Pennsylvania when the work of tuberculosis eradication was first started with conditions today, we can positively state that the disease has not only been held in check, but has been actually reduced. During the first five years of the board's existence (1896 to 1901, inclusive), an average of 17 per cent of cattle tested reacted, and 30 per cent of the reactors were tanked. The records for the last five years (1915 to 1919, inclusive), show an average of 9 per cent reacting of those tested, and but 15 per cent of the reactors tanked.

The most credit for the splendid results obtained in tuberculosis eradication, not only in Pennsylvania, but in the United States as well, belongs to Dr. Leonard Pearson, for in addition to bringing tuberculin first to this country and applying the first tuberculin test, it was he who planned the technique now used in applying the test. It was he who formulated our first State live-stock sanitary laws and regulations, designed the test charts, form of agreements, etc., which are, with but slight modification, in use today, not only in Pennsylvania but throughout the United States. It was he who did the pioneer work, blazed the way in tuberculosis eradication. His was no easy task. The thing was new and met with much opposition. He did not quit on that account, but stuck to it because he knew it was right and needed. In this work he had the assistance and valuable counsel of the two former Pennsylvania State Veterinarians, Doctors Gilliland and Marshall. This trio of peerless leaders in the profession, by reason of their capacity as scientists, intimate knowledge of the live-stock industry, administrative ability, foresightedness and tactfulness, and possessing the confidence of the people, made it possible for those who followed to accomplish the splendid results that we are now obtaining.

Due credit must also be given our practicing veterinarians. They, too, have done wonderfully valuable work in tuberculosis control. Without the assistance, coöperation and sympathy of the practicing veterinarians we could accomplish little. Our bureau has never been in sympathy with or favored any plan of tuberculosis control that would exclude our qualified and trustworthy practitioners. Our bureau welcomes the recent change made in the officially accredited plan which will permit our good practitioners to participate in the work.

Breeders and others interested in live stock have begun now, if never before, to realize that the control and eradication of tuberculosis is a pure and simple economic proposition. Live stock owners prove this themselves by so rapidly placing their herds under the officially accredited plan, regardless of the fact that the Federal and State bureaus do not have sufficient force to cope with the work. Furthermore, favorable mention is made of some phase of bovine tuberculosis control in practically every agricultural or live stock publication. The subject is given a place at nearly every agricultural meeting and farmers' institute. County agents and others, who in the past were reluctant to mention the subject, now advocate its control.

The accredited plan, proposed by Dr. O. E. Dyson, former State Veterinarian of Illinois, several years later (in 1917) approved with modifications by the United States Live Stock Sanitary Association, and afterwards adopted by the Federal Bureau of Animal Industry and practically all State regulatory officials, is undeniably the best and most uniform method yet offered for eradicating tuberculosis. Embodied in this plan are practically all the methods that have been proven beneficial in this disease. The live stock interests particularly benefit, as the best known technique is applied in detecting the disease. Infected premises are promptly disinfected. Added cattle are kept by themselves until they have passed two successful tests. Owners are advised regarding sanitation, including ventilation, light and drainage. They are also informed concerning the importance of paying close attention to the health and care of the calves. In other words, herds are freed in the shortest possible time, and after they become healthy every precaution is taken to keep them healthy.

The original accredited herd plan was amended in December, 1919. The changes in brief are as follows:

1. List of accredited herds published from time to time and those that have passed one successful test is to include a supplementary list. The supplementary list will include herds that have passed two annual tests with the exception of the herd bull. Such herds will not be issued an accredited herd certificate.

2. After a herd is accredited, and on a subsequent test not more than one reactor is found, the herd will be reinstated if all animals pass a successful test applied six months from date of the removal of the reacting animal.

3. Added cattle to an accredited herd, or to one in the process of accreditation, unless the added animals are from an accredited herd,

must pass two tests before they are permitted to be incorporated into the herds. The first or initial test must be done at points of origin. The added cattle are required to be tested by a regularly employed veterinarian of the Federal or State Bureau, or a veterinarian specially authorized by the Government and State to conduct such tests.

4. After a herd is accredited it may then be tuberculin tested annually by a specially authorized veterinarian. All tests conducted by these specially authorized veterinarians are made at the owner's expense.

5. Approved veterinarians are required to pass an examination conducted by the Federal Bureau and the proper officials of the State in which they reside.

From April, 1918, to January 1 of this year, 717 herds, comprising 11,730 cattle, were tested under the officially accredited plan in Pennsylvania, and 941, or 8.04 per cent, reacted. The work was carried out in 44 counties. Initial tests applied to 77 herds showed 70 per cent to be free. In other words, the disease was found in 30 per cent of those herds tested. Seventy-seven herds are fully accredited and have been issued certificates. We have on file close to 300 herds that have not been examined and tuberculin tested, but are on the waiting list.

In conclusion, the following are indispensably necessary to obtain a tuberculosis-free herd:

1. Veterinarians who are well qualified and interested in the work are trained in the breeding and care of cattle, also sanitation, and possess the confidence of live stock owners.

2. Owners who appreciate the economic importance of eradicating tuberculosis, are in sympathy with the work, desire to own healthy herds, and understand the requirements before beginning, will co-operate fully in respect to observing the precautions and measures and employing the means recommended by the bureaus to prevent reintroduction or development of tuberculosis in the herd.

3. A well-arranged and properly constructed and equipped barn, particular attention being given to ventilation, light and drainage.

4. If possible, breed and raise own stock. Provide proper feed and pure water.

5. Animals before being placed in the milking line should be provided with separate quarters and be permitted to have access to exercise yards. The control of bovine tuberculosis is mainly a matter of prevention of infection of new-born calves.

CLINICAL AND CASE REPORTS

MY EXPERIENCE WITH FORAGE POISONING¹

By O. B. MORGAN, *Rocky Ford, Colo.*

While this paper is entitled "My Experience with Forage Poisoning," I am wondering whether or not it would be well to speak of the disease as the "Kansas horse disease." This name seems to carry with it a more definite idea of the exact nature and extent of the disease. Those who observed the "Kansas horse disease" in Kansas in 1912 and this disease say they are the same thing. Perhaps neither one of these names is what it should be called, but they will do for the present so we will have an idea of the disease we are going to talk about.

HISTORY OF CASES

On July 17, 1919, I was called to see a mare over 15 years old suckling a colt. In conversation over the telephone the owner said he thought this animal had some form of digestive trouble. On arrival at the ranch I found the animal lying down flat on one side and would occasionally raise the head and point toward the side. With very little effort we got the animal up and she staggered up against the barn and stood there. After moving her away from the barn she wanted to turn in a circle. Her temperature was 105, pulse normal but very strong, conjunctival mucous membrane highly congested and the membrana nictitans showing ecchymotic hemorrhages. The abdomen was very much tucked up, a furrow extending backward from the costal arch presenting a very gaunt appearance, with peristalsis absent. On examination of the mouth I found a very offensive odor and pharyngeal paralysis.

I was informed by the owner that the animal came up with the rest of the animals from the pasture the previous evening and was noticed to be gaunt and a little stupid. The following day this animal was kept in the corral and was noticed lying down most of the time and would get up without assistance. After gaining her feet she would go in a circle, but was not very nervous. The bowels had moved a few times during the first 24 hours of her illness, at first loose, later more firm. I began to question the owner as to the foods, and he informed me that the animals were on pasture and it was as good as any pasture in that vicinity. At this

¹ Paper presented at the annual meeting of the Colorado Veterinary Medical Association, Rocky Ford, Colo., February, 1920.

time I was of the opinion that I was dealing with a sporadic case of forage poisoning.

On July 22, 1919, I was called to an animal one and one-half miles from the first case that was showing practically the same symptoms. This animal was being worked regularly, getting good, clean hay and water from a well. On July 24, 1919, I was called to another case showing practically the same symptoms. I did not have any more of these cases until August 1, then I began to receive a number of calls of the same nature within a 3-mile radius of the first case. This disease was rapidly appearing in this vicinity, gradually spreading west and north. It has made its appearance in almost all localities of the Arkansas Valley and extending to the northern part of the State.

At this time I began to realize that I was dealing with an enzoötic and made a closer search for the offending material. I found all the foods fairly clean; at least they looked so, but the water in some places was not very good. These cases were developing close to a reservoir, some in swampy places where the water was low and lots of salt grass, and some where they were being kept up and fed hay and getting good water. Later cases were observed on the dry land where nothing was growing except buffalo grass and getting water from a deep well.

It would be hard to imagine how a mold could develop on such a high and dry pasture as that and produce disease as has formerly been thought. At first it seemed as though the stagnaⁿt water and pasture might be a source, and owners were advised to keep their animals up and give them good water and hay. We found that cases developed about the same. Next they were advised to feed first-cutting hay and if possible last year's hay or prairie hay that was shipped in, but not any green feed. In other vicinities everybody kept their animals in corrals, for they did not have any pastures. A few when advised fed first-cutting hay. In both places cases developed after 21 days of feeding first-cutting hay and no green feed. I failed to find anyone who had last year's native hay to feed, and I know of only 3 cases where prairie hay was fed. In the first case a part of a bale of alfalfa was fed by the help, contrary to the owner's wishes, and about 14 days later one of the animals developed the disease. In the second case the animal had about 15 minutes' grazing, and some 12 days later it developed the disease. In the third case first-cutting alfalfa was fed about 2 weeks after the disease started, then they fed prairie hay and corn that was

shipped in and bran and oats that were home-grown. These 4 animals remained well. It would seem that in the first case feeding alfalfa apparently carried the infectious material and in the second case the grass was the probable carrier; however, sufficient evidence is not at hand to enable one to determine the various sources of the infection. It seems as though cases developed under all conditions with the exception of the feeding of prairie hay which was shipped in.

A number of colts developed the disease, the ages ranging from 15 days to 5 months. If the different foods are carriers of the infectious material, which seems to be the case, it would seem that it would take a very small quantity to produce the disease. In the case of two young colts (15 and 21 days old), a few straws at the best would be about all the food they would get outside of their mother's milk. In no case to my knowledge did the sucking colt of the affected mother develop the disease, and the mothers of affected colts remained well with the exception of one, in which case the mother developed the disease a few days after the colt did.

A well animal was injected intravenously with 30 mils of blood from an affected animal and failed to develop the disease. Of course this one test does not prove that it can not be transmitted in that way, but it would seem that it was not easily transmitted from one animal to another. The heavier type and the fattest animals seem to have the disease in a more severe form, particularly those that were worked at the time of illness. I think the reason is that in the majority of cases the animals were worked a part of the day while they were sick. The horses in pastures seemed to have had the disease in a milder form, or they were better able to withstand it. The majority of animals in the pasture being young and not unduly exerted while sick probably explains why they had it in a milder form.

I saw 10 young colts affected with the disease, and all recovered except one, which was drenched before I saw it and probably died as a result of drenching. I also saw animals 21 years old, one jack and a few mules affected.

SYMPTOMS

While I gave the symptoms in the first case, they were by no means complete of this disease; so I will describe them in a general way. In some cases profuse sweating was noticed 12 to 24 hours previous to the attack, and in some cases gaping was one of the

first signs, while in others there would be lameness. If the animal was being worked the owner would notice it to be very stupid, and in a number of cases the animals were forced to work the rest of the day, as the owners thought they were laying off on them. In some cases there would be frequent bowel movements before other symptoms would develop. On examination one would find the temperature from 100 to 106, or even subnormal, the pulse usually around normal in rate but very strong, later fast and weak; peristalsis very weak or maybe absent; the abdomen very much tucked up, presenting a very gaunt appearance; the feces soft, mixed with mucus and tinged with blood at first, later becoming more firm and coated with mucus; the tongue hanging out the side of the mouth or between the teeth; in a few cases there was grinding of the teeth; very offensive odor from the mouth, and pharyngeal paralysis in the majority of cases. There would be a serous discharge from the eyes and nose, to be followed by a mucous discharge. On examination of the eye, the conjunctiva would be congested and red, and in some cases icteric; the membrana nictitans would show ecchymotic hemorrhages; the eye was sometimes unable to close, the ear drooped, the upper lip drawn to one side and the lower lip dropped. The same expression is seen here as in those cases where the seventh nerve is paralyzed, as in facial paralysis; this may be unilateral or bilateral. Blindness is not very common. The animals may stand with eyes half closed and go to sleep on their feet, or they may show excitement, running into objects, getting into a corner and pushing; some cases walking stiff-legged as if they were not able to maintain their equilibrium.

The course of the disease depends on the severity of the symptoms; in some cases the disease runs a rapid course and terminates fatally in from 12 to 24 hours, while other cases develop more slowly and terminate either fatally or recover in from 24 hours to 10 days. Some cases fall over dead after they have apparently recovered, and a few cases were somewhat deranged mentally for some weeks, while a very small per cent are permanently deranged. A large majority of those that do recover are practically as good as ever.

TREATMENT

The treatment of this condition will depend largely on the symptoms present. While veterinarians may differ somewhat in their method of treating this condition, the end results are about the same, from what I can find out by consulting them.

Treating the symptoms seems to be the logical way to deal with this disease. The stomach tube should always be used to medicate these cases and give them the necessary water. Drenching is a dangerous procedure in nearly all cases. All kinds of cure-alls have been used; among them are pouring chloroform in the ear to kill the larvæ of a tick that is supposed to burrow into the brain and cause the trouble; cutting off the tail, rubbing the spine with St. Jacob's oil, and smoking with old shoes and tar, so they run at the nose. We had a good many "village hoss doctors," some that were in the Kansas outbreak and never lost a case.

Purgatives are always in order, both the rapid and the slow-acting ones; of the slow-acting purgatives, aloes or aloin, preferably Barbados aloes, where they can be given in capsules, as they are not very soluble in water. Aloes were given in 1 to 2 ounce doses and aloin in from one-half to 1 ounce doses, with 2 to 4 pounds of magnesium sulphate, and water from 3 to 10 gallons. In no case did superpurgation follow. After purgation was established only a very few cases failed to recover. Mineral oils were used without apparent benefit. I have used castor oil with fair results, but it does not seem to act as rapidly as aloes and magnesium sulphate. It was discontinued in the mature animals, but was used altogether in colts in from 4 to 6 ounce doses and the results were very good. Barium chloride was also used in some cases with good results.

In those cases that were unable to drink, large quantities of water were given, to which was usually added salt in sufficient quantity to make approximately a normal salt solution. This was given every 24 to 48 hours and continued for as long as 10 days. The water not only supplies the body with the necessary fluids, but assists the purgatives.

Of the hypodermic cathartics, arecolin seems to give the best results, as it not only moves the bowels, but lowers blood pressure, and rapid improvement frequently follows its administration. The drug is used in one-half to 1 grain doses. Great care should be used in its administration, as a heavy animal and a few that are not heavy rarely survive its administration.

Thinking that the infection originated in the intestinal tract, various intestinal antiseptics were used, and I believe there was some benefit derived from their use.

The nervous symptoms were controlled with fluid extract of gelsemium in 1 dram to 1 ounce doses at hourly intervals until the desired results were obtained. I have seen more marvelous results

from the use of this drug in cases of cerebral excitement and also good results where some coma was present. I have used it on cases that were raving maniacs and had them perfectly quiet in 3 to 5 hours later, eating and drinking in 10 hours. Potassium iodide was used on those cases that were slow to recover, with beneficial results.

With the foregoing treatment my recoveries were 61.2 per cent.

GARDEN PARTY IN HONOR OF DEAN AND MRS. HOSKINS

A most delightful garden party in honor of Dean and Mrs. W. Horace Hoskins of New York University, given by Professor and Mrs. William Herbert Lowe on the spacious grounds surrounding their residence, Trenton avenue, Paterson, N. J., Saturday afternoon, July 17, proved a great success. Many guests from New York City and Northern New Jersey were present, including the following: Major E. B. Ackerman, Dr. W. J. McKinney, Miss A. McKinney, Dr. and Mrs. A. H. McIntosh, Mrs. Cline, Dr. and Mrs. Geo. W. Little, Dr. and Mrs. E. T. Davison, Professor and Mrs. Wilfred O. Lellman, Mrs. Roscoe R. Bell, Miss Virginia Bell, Dr. and Mrs. A. F. Martins, Dr. and Mrs. Thos. H. Ripley, Dr. and Mrs. E. J. Decker, Miss Dorothy Decker, Dr. and Mrs. J. Payne Lowe, Miss Helen Lowe, Mr. Jack Lowe, Mr. Edward Whitmore, Mr. Howard Bristow, Mr. Robert Boyle, Miss Harriet Lowe Coombs, Miss Alice Coombs, Miss Melissa Hurd, Dr. Edward A. Schmalz, Miss Lamb, Dr. and Mrs. C. W. Shaw, Dr. Geo. H. Berns, Miss Nellie Berns, Dr. and Mrs. J. W. Haffer, Dr. and Mrs. R. W. Butterworth, Miss Jennie Young, Prof. Henry Henning, Dr. and Mrs. J. B. Finch, Prof. and Mrs. William Herbert Lowe, Dean and Mrs. W. Horace Hoskins, Dr. and Mrs. Nicholas Kaiser, Mayor and Mrs. J. B. Hopper, Dr. and Mrs. T. E. Smith.

Veterinary progress in the newly created nations of central Europe is indicated by the founding of two new veterinary schools, one at Zagreb (Agram) for the Jugo-Slavs, and the other at Brünn for the Czecho-Slavs.

Dr. J. F. A. Bessemans, Sanitary Inspector of the Belgian Government, has been visiting the various laboratories in New York, Philadelphia, and Washington, with the view of informing himself regarding the work that is being done in this country to prevent the transmission of animal diseases to man.

ABSTRACTS

A POSSIBLE FAILURE OF TUBERCULIN IN COWS IN GESTATION OR WHICH HAVE JUST CALVED. R. Bissauge. *Rev. Gén. Méd. Vét.*, Vol. 28 (1919), No. 336, p. 679.

From 1915 to 1918 Bissauge had occasion to verify the sensitiveness of cows in pregnancy, or that had recently calved, to the intradermic palpebral tuberculin test, in 3 herds of 16 to 20 cows each, which were sold for slaughter. These herds were known to have been badly infected with tuberculosis for several years. The test revealed a large number of affected animals, but the clearly positive reactions were less numerous than had been expected. Of 12 pregnant cows found on autopsy to be slightly affected with tuberculosis, 4 had not reacted and 2 had given only doubtful reactions. Of 6 cows that had calved within 8 days, 2 that were found on autopsy to be tuberculous had not given clear reactions, while in 4 tuberculous cows that had calved 12 to 15 days previously the reaction had been typical.

The author formulates the following conclusions: (1) In the last two months of gestation, and especially in the last month, the reaction to tuberculin may fail or may manifest itself only very lightly in tuberculous cows, even without fever. (2) The same may also occur in cows that have recently calved, up to the tenth day after calving. He also concludes that it is prudent not to submit to the tuberculin test, even by the intradermic method, pregnant cows unless they are less than seven months in pregnancy, nor cows which have recently calved, until after 10 or 12 days.

In this connection he cites the work of Bar and Devraigne (*Journal d'Obstétrique*, April, 1919) on pregnant women. They found that pregnant women are less sensitive than others to tuberculin, and that the diminution of sensitiveness is especially pronounced during the last month of gestation and very marked during the days following delivery. To this extent they confirmed the earlier work of Stern. But Stern had reasoned that, since the positive reaction indicates the presence of antibodies, in pregnant women the antibodies diminish or even disappear; and having injected lecithin for ten days and observed no reaction he concluded that the lipoids, in excess during pregnancy, attract the antibodies and fix them, after which there is no reaction to tuberculin. Bar and Devraigne, however, in attempting the experimental verification of the influence of pregnancy on the antibodies, obtained negative results.

INTESTINAL COCCIDIOSIS OF SHEEP IN MOROCCO. Assistant Veterinarian Major Bouin. Rec. Méd. Vét., Vol. 95, No. 21 (1919), p. 617.

Intestinal coccidiosis of sheep is a well known disease always existing in Morocco, but not reported. It has been well studied and described by Moussu and Marotel.

In Morocco, Velu has mentioned an epizootic coccidiosis discovered in a flock of goats. Besides, he reported the existence of *Eimeria zurni* in cattle apparently in a good state of health.

The author had the opportunity of following an epizootic of intestinal coccidiosis ravaging a flock of sheep. The first autopsies did not permit of a diagnosis; there were no internal or characteristic lesions, and very few parasites.

In the presence of so small lesions intestinal coccidiosis suggested itself and the microscopical examination confirmed the opinion.

The symptoms observed were those of progressive anemia, but at a relatively rapid rate, contrary to what has been reported by Moussu and Marotel. In a general way the duration of the disease was from 8 to 10 days.

The first symptoms observed by the shepherd are dullness and indolence. The patient painfully follows the flock, then remains behind, and lies down. The appetite is decreased, but not absent.

Diarrhea appears, almost solid at first, but later more liquid. The animal emaciates and the mucous membranes become pale. The patient generally succumbs without displaying other symptoms.

It is interesting to note that the epizootic which is described involved a flock which was well taken care of and well fed, pasturing on a field which was frequently irrigated.

This flock, which comprised 500 head, consisted chiefly of yearlings. All the animals which died were of that age. Nearly all the animals which remained with the flock died. On the contrary, those removed at the beginning of the affection were cured spontaneously without any particular treatment.

The epizootic commenced at the end of April. During the months of May and June 50 animals died, that is, 10 per cent of the whole.

The lesions encountered at each autopsy were the lesions of hemorrhagic enteritis, most of the time showing only in the large intestine.

Besides, on the surface of the whole intestine was generally found more or less numerous small white points, smaller than the head

of a pin, which were the glands of Lieberkuhn hypertrophied and containing an abundance of coccidia.

The casual agent was the *Coccidium faurei* studied and described by Moussu and Marotel. It is easily found by microscopical examination of the excrements of the patients, but more easily and more distinctly by examining the scrapings of the intestinal mucus around the small white spots mentioned above.

It was only with difficulty and after long researches, that the *Coccidium faurei* was found in the excrements of the old members of the flock, which were in a good state of health. The danger to which the flock is exposed through these apparently healthy animals which, however, are carrying parasites, is evident.

The conditions under which this epizootic appeared prevented any medicinal treatment. The bedding places where the animals were placed every night were changed frequently. After each change the mortality ceased for a few days, but the disease reappeared later. From this the author concludes that better results might have followed if the sheep had been moved to a greater distance and to new pastures.

JOINT ILL IN FOALS. Abstract from *The Lancet*, London, Vol. 198, No. 5036 (1920), p. 563.

Among other interesting matters the *Journal of Comparative Pathology and Therapeutics* for December, 1919, contains an account of experiments conducted at the Research Institute in Animal Pathology, Royal Veterinary College, London, into the cause and serum treatment of joint ill in foals. The investigations were conducted by Sir John McFadyean and Captain J. T. Edwards. The chief organisms found in bacterial and cultural examination of the diseased joints were streptococci, coliform bacilli, *Bacillus nephritis* (Meyer), an interesting case of streptothrix, and three cases where the organisms were not of any named species. Seventy-two cases were examined during two years of research. The conclusion come to by the investigators is that vaccines and serums are not of any value in the treatment of pregnant mares which are likely to produce affected foals, nor are they preventive or curative of joint ill when applied to the foal itself. Two hundred and fifty-three cases were treated with the antistreptococcus serum and the authors base their conclusions on these results. Joint ill causes the death in early years of much valuable equine stock, and these investigations should lead to further understanding and research with regard to the

disease. At present clean and hygienic stables, proper feeding of the dam, and careful attention to the umbilical cord of the foal at birth seem to be the best preventives. It is somewhat significant that common bred stock kept largely out of doors, or in stables with few animals in, suffer the least from outbreaks of joint ill.

COMMUNICATION

FOOT AND MOUTH DISEASE IN FRANCE

The following letter from Grandpré, in the Argonne region of France, is self-explanatory:

"The farmers here having lost all their cattle owing to the war—this country was four years in German hands—are now losing their fresh stocks of cattle owing to foot and mouth disease. There seems to be two sorts, one which takes the ordinary course, in which the animals are ill for some time, and die or recover, and another where death takes place in a few hours. I have just been told by a visitor from Philadelphia that in the States you have controlled this disease, and that if I applied to you, you would be so kind as to give me the necessary information. If so, I should be very much obliged, as living here in continual contact with the farmers, I cannot fail to be much distressed by what is a very serious loss to them. They are working most pluckily, under very hard conditions, to overcome the consequences of the war, and this bad setback means discouragement as well as great pecuniary loss."

WOMAN NURSE IN CHARGE OF DOG HOSPITAL

Dayton, Ohio, now has a full-fledged dog and cat hospital.

And it also has a dog grocery.

The combination has been established by Dr. H. T. Moss, veterinarian, at 710 West Third Street. It is the only institution of the kind in that section of the country.

The hospital is for pets of all kinds, chiefly dogs and cats. The hospital is divided into stalls or "wards." A woman nurse is in charge to minister to the needs of the animals. The kennels are large and sanitary, convenient to the individual treatment of animals. The grocery is in front and the stock consists of everything required by the dog from biscuits to muzzles. The building is a new two-story pressed brick, recently completed.

ARMY VETERINARY SERVICE

ARMY VETERINARY SCHOOL

The War Department recently announced in Circular No. 271, dated July 16, 1920, the establishment of the above mentioned school for the Army Veterinary Corps. This is the first school to be authorized for the Veterinary Corps and it shows that a definite program of instruction for veterinary officers and enlisted men is to be developed.

A school designated as the Veterinary School of Meat and Dairy Hygiene will be maintained at the General Supply Depot, Chicago, Illinois. The object of this school is to instruct veterinary officers and selected enlisted men of the Medical Department assigned to the Veterinary Corps in duties pertaining to the inspection of meats and meat food products, dairies and dairy products and forage in connection with the purchase, storage, shipment and issue of these supplies, and to the sanitation of establishments, storehouses, vehicles or other places in which they are prepared, stored, shipped, issued or otherwise handled.

A course of instruction at this school is expected to form a part of the military training of every veterinary officer or candidate for commission in the Veterinary Corps and of the necessary Reserve Officers. It will, therefore, constitute an integral factor of the system of Medical Department training under the general direction of the Surgeon General.

As one of the activities at the General Supply Depot, the Depot Officer will be commandant of the school. Instruction at the school will be under the immediate charge of the veterinarian of the Depot assisted by not to exceed three veterinary officers as instructors and four enlisted men as assistant instructors who will be designated by the Surgeon General for these duties. While this personnel is primarily for instruction purposes, its services may be utilized for inspection duties at the Depot when such duty will not interfere with the course of instruction.

Instruction will be given in two classes each year beginning July 15 and January 15 and lasting about 5 months. Each class will consist of not to exceed 15 officers and 20 enlisted men. Each officer and enlisted man who satisfactorily completes the course will be given a certificate of proficiency signed by the commandant and by the veterinarian in charge.

Instruction schedules will be prescribed by the Surgeon General after conferring with the Quartermaster General with reference to such phases of the inspection work as are directly concerned with specification requirements. It is intended that graduates of the school shall be fully qualified not only in all sanitary inspection requirements but also in the application and interpretation of purchasing specifications.

Instruction will be by means of lectures and demonstrations followed by practical application of inspection measures in the stock yards, packing houses and other available establishments. Successful training demands from the student the utmost degree of personal contact with the actual inspection procedures at all times under the supervision of an instructor. Quizzes and periodical examinations will be required in all subjects and each student will undergo a final examination.

Major George A. Lytle, V.C., is the veterinarian in charge. Captain H. S. Eakins, V.C.; 1st Lieut. H. P. Welch, V.C.; and 1st Lieut. H. J. Juzek, V.C., have been detailed as instructors.

The following veterinary officers compose the first class ordered for instruction:

Colonel W. G. Turner, Lieut. Col. J. R. Jefferis, Majors H. W. Peter, J. A. McKinnon, W. R. Pick; Captains R. C. Musser, W. J. Stokes, D. B. Leininger; 1st Lieuts. A. C. Wight, E. L. Nye, H. Clarke, E. M. Curley.

NO WHISKEY FOR ANIMALS

A member of the American Veterinary Medical Association requested me to find out if veterinarians could prescribe alcoholic liquors for their animal patients.

This matter was taken up with the Bureau of Internal Revenue and the following reply was received:

"Replying to your communication of June 16, 1920, you are informed that veterinarians may not prescribe intoxicating liquors for internal use for their animal patients. Under the statute the right to prescribe intoxicating liquors for internal use for medicinal purposes is limited to duly qualified physicians for persons only. Not to exceed 6 quarts of alcohol may therefore be obtained by any veterinarian during any calendar year to be obtained and used as provided by Regulation 60."

N. S. MAYO, *Secretary.*

ASSOCIATION MEETINGS

NEW YORK STATE VETERINARY MEDICAL SOCIETY

The thirtieth annual meeting of the New York State Veterinary Medical Society was called to order by the President, Dr. H. S. Beebe, July 21, in the large lecture room of James Law Hall at the New York State Veterinary College at Cornell University. Acting President A. W. Smith gave an address of welcome on the part of Cornell University. Hon. E. C. Stewart, Mayor of the City of Ithaca, gave a welcome for the city of Ithaca. Mayor Stewart was a member of the upper chamber of the New York State Legislature when it passed the bill establishing a Veterinary College at Cornell University. He was able to influence the passage of that bill to a very considerable extent. He was thus well qualified to review the history of the legislation in behalf of veterinary medicine in the State. Mayor Stewart did this to the very great interest of all his hearers. After such a warm welcome as extended by President Smith of Cornell University and the Mayor, the members and visitors felt entirely at home so far as Ithaca and Cornell University were concerned. Dr. E. L. Volgenau of Buffalo was scheduled to respond to the previous speakers. Business interfered with his being present. Dr. W. Reid Blair kindly consented to take his place and proved to be a very happy choice. In agreement with the requirement of the constitution and by-laws of the society, President Beebe gave an interesting and helpful address touching upon the condition of veterinary medicine in New York State. The usual order of business was then taken up. The reports of the various committees were unusually interesting and complete. The Board of Censors nominated fifteen new members. All of the men put in nomination were acceptable and were duly elected.

The first paper of the first day was "The Cultivation of Bact. Tuberculosis Direct from Sputum and Infected Tissue," by Dr. Giovanni Martinaglia. Dr. Martinaglia, a native of South Africa, and a graduate of Toronto, worked during the past year in the laboratory of Dr. V. A. Moore. From his work he was able to present a most interesting paper and many actual cultures with which to illustrate it. Dr. V. A. Moore and Dr. W. A. Hagan discussed the paper and added much to its value. During the afternoon session Dr. W. A. Hagan read a short paper on "Fat Necrosis in Cattle." It was emphasized by Dr. Hagan and Dr. F. W. Andrews, who

discussed the paper, that the condition was frequently taken for tuberculosis in field work. Dr. W. W. Williams of Springfield, Mass., read an interesting and instructive paper on "The Diseases of the Bull Interfering with Reproduction." This paper was illustrated by lantern slides and microscopic demonstrations. The illustrations and microscopic demonstrations in the main were of spermatozoa in both physiological and pathological condition. The main discussion was by Dr. C. M. Carpenter. Dr. H. L. Gilman followed Dr. Williams with a paper on an allied subject, "Diseases of the Oviduct of the Cow and Their Relation to Sterility." The authors of the last two papers are among the pioneers in the respective subjects. The work of Dr. Gilman, as did that of Dr. Williams, brought forth favorable discussion and comment. Dr. Gilman illustrated his work with excellent lantern slides. Dr. L. J. Tompkins chose as his subject "The Care of the Milking Machine." Dr. Tompkins is in his own field in discussing problems relating to milk production. Dr. C. I. Corbin and Dr. J. McCartney, likewise experts in the production of clean milk, discussed the paper.

It is rather unusual for this society to continue the program into an evening session. It is more unusual for such a meeting to hold the undivided interest of members and visitors until near the midnight hour. That the speakers were able to continue the program until such a late hour is a tribute. The dinner was served in Baker Tower and on the campus of Cornell University. At its conclusion President Beebe called on Dr. W. G. Hollingworth, who read a paper entitled "Be Kind to Animals." Dr. Hollingworth developed the subject in such an interesting manner that the local press borrowed the paper for the next day's issue. Dr. Hollingworth had able support in the discussions of Dr. V. A. Moore and Dr. P. A. Fish, each of whom had interesting and instructive points to make. Dr. Beebe next called on Dr. H. D. Bergman of Ames, Iowa, who arrived during the day's session. Dr. Bergman gave a short talk, comparing the difference in subjects which interest the practitioner of New York and Iowa as revealed by the programs of the two State societies. Dr. Bergman was welcomed in all the meetings and we were glad to have had him with us. Dr. V. A. Moore next talked on "Anaphylaxis and the Tuberculin Reaction." Dr. Moore illustrated his talk with charts and frequent reference to the valuable literature on the subject. He discussed rather fully the tuberculin reaction, its relation to anaphylaxis and the relation of both to the non-reactor. This talk was a masterly discussion of the problem.

of those administering the tuberculin test and handling tuberculous animals. Dr. J. G. Wills, Dr. H. B. Leonard and Dr. Cassius Way sustained the interest in the talk by their able discussions.

Dr. C. R. Baldwin read the first paper of the second day's session on "Mange in Cattle." His paper brought forth a considerable number of good discussions. The next paper by Dr. Chas. S. Chase on "Mammitis," met with a good reception and brought forth extensive discussion, led by Dr. J. N. Frost. Dr. W. Reid Blair had chosen as a subject for a paper "Animal Intelligence." Dr. Blair, in his connection with the New York Zoölogical Gardens, has had a lot of experience leading up to his subject. His paper was one of the most interesting given during the meeting. It was illustrated by a large number of lantern slides in color. These slides told a very complete story in themselves. The paper was of general as well as practical interest and we could have had an audience of 2,000 people for it just as well as 200 had we appreciated its scope. Dr. R. A. MacKellar and Dr. W. G. Hollingworth added interesting discussions.

The papers on the afternoon program were well up to those coming before. Dr. H. J. Milks and Dr. S. A. Goldberg had prepared a paper on "Infectious Enteritis in Cats." Dr. Milks read it and Dr. Goldberg discussed it. Dr. F. F. Koenig's paper on "Diseases of the Foot of the Cow and Treatment" was appreciated and was discussed by Dr. W. B. Switzer and Dr. A. H. Ide. Dr. W. E. Frink had an excellent paper on "Hog Cholera Control." Dr. W. L. Clark, Dr. R. R. Birch and Dr. W. H. Salisbury discussed it. Dr. J. M. Staley of the H. K. Mulford Co. read the last paper. The subject was "Bovine Abortion Bacterial Vaccines." Dr. L. A. Norget was to have presented some unusual and interesting case reports. Illness detained him at home and so his paper was not presented.

The completion of the order of business resulted in the election of Dr. Wright J. Smith as president, Dr. D. H. Udall as vice-president, Dr. C. E. Hayden as secretary-treasurer, and Dr. H. J. Milks as librarian. Dr. D. B. Comstock, Dr. W. E. Frink, Dr. W. H. Phyfe, Dr. W. Reid Blair and Dr. W. L. Clark were elected to constitute the Board of Censors. Buffalo was designated as the place of the next meeting.

Clinics and postmortems were held during Friday morning in the operating and postmortem rooms of the college.

The wives, daughters and sons of the members who visited were

present at the opening exercises. At noon they had luncheon at the Wistaria Tea Garden. At 4 p.m. they were given an organ recital in Bailey Hall by Prof. J. T. Quarles. In the evening they attended the dinner session. On Thursday they enjoyed a visit to Watkins Glen. In the evening Dr. and Mrs. V. A. Moore held an informal reception at their residence at 914 East State street. About 200 members and visitors had opportunity to meet each other and enjoy the hospitality extended by Dr. and Mrs. Moore.

C. E. HAYDEN, *Secretary*.

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

The eleventh annual meeting of the C. N. Y. V. M. A. was held at Syracuse, June 30, 1920.

The session was opened with a clinic at the Infirmary of Dr. J. A. Pendergast, which took from 9.30 a. m. until 3 p. m., lunch being served at the clinic.

The cases operated on were as follows: Black mare, myotomy of tail, Dr. Dooling's case. Surgeons: Drs. Ide, Pendergast and Dooling.

Brown mare, elongated tooth, Dr. Stack's case. Surgeons: Drs. Stack and Long.

Mule, extracting molar, Dr. Pendergast's case. Surgeons: Drs. Pendergast and Ide.

Black gelding, ulcerated corn, Dr. Pendergast's case. Surgeons: Drs. Pendergast and Dooling.

Gray mare, quittor, Dr. Dooling's case. Surgeons: Drs. Bosshart and Boardman.

Roan gelding, roarer, Dr. Pendergast's case. Surgeons: Drs. McAuliff and Boardman.

This closed a very interesting and successful clinic, and an adjournment was taken to meet at the St. Cloud Hotel.

The business meeting was called to order at 3.30 p. m., at the Hotel St. Cloud, with President W. L. Clark in the chair. At the call of the President the Secretary read the minutes of our last regular meeting, which were approved.

Roll call by the Secretary showed the following members present: Drs. F. E. York, J. A. Pendergast, J. M. Currie, E. E. Cole, A. J. Tuxill, E. E. Dooling, W. L. Clark, A. E. Merry, C. R. Baldwin, W. M. Pendergast, Almond H. Ide, J. H. Hewitt, J. K. Bosshart, M. W. Sullivan, R. C. Hartman, F. C. Overton, J. H. Stack, W. M.

Long, D. A. Boardman, George A. Shaw, Dr. Otto Faust, and W. B. Switzer.

The following applications for membership were presented: Dr. F. E. Hoyt, Dr. D. M. Hoyt, Dr. J. L. McAuliff, and Dr. J. B. Knapp.

There was a motion made and carried that the Secretary cast one ballot for the above mentioned gentlemen and upon such ballot being cast they were declared elected to full membership.

Motion made and carried that the Secretary be instructed to see that all members who have not received their membership certificate get them at our next regular meeting.

At this time the President delivered his address, which was both interesting and instructive, and was duly accepted.

The Secretary gave a brief verbal report of the work of the year, calling particular attention to the number of new members taken in.

The Treasurer's report was then read and showed the Society to be in a flourishing condition. This report was referred to the Auditing Committee, which reported favorably and it was accepted.

Dr. F. M. Burke was reported as being in the Crouse Irving Hospital for an operation, and the Secretary was instructed to write Dr. Burke in behalf of the Society, assuring him of our sympathy and best wishes for his speedy recovery.

The meeting now proceeded to the election of officers, and on calling for nominations for President, Dr. A. J. Tuxill's name was presented. There being no other nomination the Secretary was instructed to cast the unanimous ballot in favor of Dr. Tuxill.

President Clark at this time seated the new President and turned the meeting over to him.

President Tuxill then called for nominations for Vice-President. At this point Dr. E. E. Dooling arose and after making some very complimentary remarks, presented the name of Dr. J. K. Bosshart for Vice-President. There being no other nominations the Secretary was instructed to cast the unanimous ballot of the Society for Dr. Bosshart.

Ex-President Clark was then instructed to cast one ballot for the reëlection of the Secretary-Treasurer.

In electing a Board of Censors, it was suggested that the name of Dr. H. A. Turner be removed from the list as it now stands and Dr. C. R. Baldwin be substituted. It was so ordered.

Censors are Dr. E. E. Dooling, Dr. J. C. Stevens, Dr. A. H. Ide, Dr. J. H. Stack, Dr. W. G. Hollingworth, Dr. C. R. Baldwin.

The following papers were then presented: Difficult Parturition Relieved by Embriotomy, by Dr. W. M. Pendergast. Mastitis and Pericarditis, by Dr. D. A. Boardman. A case of partial torsion of the neck of uterus, by Dr. W. M. Sullivan.

These subjects were all well discussed and proved very interesting and instructive.

Dr. Dooling moved that one year's dues be refunded Dr. Hewett. This motion was carried and the Secretary ordered to draw a check for the amount in favor of Dr. Hewett.

Dr. Hewett accepted the check under protest, and immediately presented it to the Society, after which he was given a rising vote of thanks.

It was moved and carried that the four new members furnish papers for the next meeting, to which they agreed. Dr. Currie, Dr. Hewitt, and Dr. E. E. Cole also volunteered papers.

At this point we adjourned to meet the ladies and proceeded to the banquet table.

President Tuxill appointed Dr. E. E. Dooling as toastmaster, and after every one had eaten until there was no further incentive for this pleasant diversion, the toastmaster introduced the Hon. J. R. Clancy as the principal speaker of the evening.

His subject was "The Relation of the Veterinarian to the Stock Owner." It was very instructive, and contained some reminiscences of the late Dr. Matt Henderson, which were well received.

The toastmaster then called on Drs. Faust, Currie, Pendergast, Clark and others, all of whom added some happy thought to what we had already received.

Adjournment was taken at this time with a feeling that this was one of our very best meetings, and we shall look forward to the coming semi-annual meeting in November.

W. B. SWITZER, *Secretary*.

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY

The Veterinary Medical Association of New Jersey held its thirty-sixth semi-annual meeting at Asbury Park, N. J., on July 8 and 9. This meeting had a large attendance and proved to be most successful.

On the first day many papers were submitted which allowed very interesting discussions and on the day following a clinic was held at

Dr. V. B. Height's Veterinary Hospital, where the members had the opportunity of witnessing several operations.

Among the papers read was one prepared by Dr. Arthur D. Coldhaft, of Vineland, N. J., who took as his topic "Tapeworms in Chickens."

The following resolution upon the death of Dr. James McCaffrey, of Red Bank, N. J., was spread upon the minutes:

Whereas, the death of our respected and esteemed colleague, Dr. James McCaffrey, of Red Bank, N. J., a graduate of the American Veterinary College, New York City, class 1885, fills our hearts with sadness; and

Whereas, in his demise the State loses an estimable citizen and the profession of New Jersey one of its most successful practitioners: Therefore be it

Resolved, That a page be set apart in our minute book to his memory and that we express our sympathy to his family in their bereavement; and be it further

Resolved, That a copy of these resolutions be furnished the veterinary periodicals for publication, and also that a copy be sent his family.

R. W. BUTTERWORTH, *Secretary*.

NORTHWESTERN PENNSYLVANIA VETERINARY CLUB

In December, 1919, a number of representative veterinarians from the northwestern section of Pennsylvania met at Corry and formed the Northwestern Pennsylvania Veterinary Club, the sixth club of its kind in Pennsylvania.

A second meeting of this Club was held at Corry in March, 1920, a third at Titusville, May 3rd, and a fourth with twenty-one veterinarians present was held July 12th at Conneaut Lake. This was the banner meeting of the Club and can be attributed to the united efforts of all members.

Dr. Leon A. Eckart, President, Dr. W. W. Pease, Secretary, and Dr. M. P. Hendrick had arranged for the following interesting program:

Address of Welcome by Mr. S. A. Cooper, President of Conneaut Lake Chamber of Commerce.

Ridgling Castration.—Dr. W. W. Wilson.

Demonstration of Double Treatment for Hog Cholera.—Dr. H. B. Mitchell.

Diagnosis of Lameness.—Dr. F. E. Jones.

Cattle Practice.—Dr. F. A. Marshall.

Spaying of Small Animals.—Drs. Castor and Eckart.

Under new business and at the invitation of Dr. R. B. McCord it was voted to hold the next meeting at North East on October 4th.

New Officers elected were: Dr. F. E. Jones, President; Dr. D. R. Royer, Secretary.

Under general discussion, Dr. T. E. Munce, State Veterinarian, gave some interesting facts relative to accredited herd work, hog cholera, abortion and sterility.

The following veterinarians were present: E. A. Anderson, R. B. McCord, M. P. Hendrick, E. S. Pickup, F. E. Jones, T. E. Munce, P. L. Rouse, T. J. Coulter, W. W. Pease, George E. Harry, F. H. Benjamin, H. B. Mitchell, E. Green, W. W. Wilson, F. A. Marshall, E. C. Porter, David R. Royer, Lewis D. Sloan, C. D. Evans, M. R. Smith, E. M. Coover, and A. P. Sturrock.

The ladies who were in attendance enjoyed the many pleasures afforded at Conneaut Lake.

D. R. ROYER, *Secretary*.

MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION

The twenty-third semi-annual meeting of the Minnesota State Veterinary Medical Association, was held at Austin, Minnesota, July 22nd and 23rd. There was a much larger attendance than was anticipated. One hundred and twenty-five veterinarians were in attendance.

Dr. C. A. Nelson, of Brainerd, read a very interesting paper on "Rumenotomy." This was followed by a paper on "Glandular Substance in Medicine," by Dr. N. S. Mayo, of Chicago.

Many new things were brought up by Dr. Mayo, as regards the application of the newer scientific discoveries of the internal secretions of the different glands of the body. Following this discussion, the subject of "Prices for Veterinary Services" was opened by Dr. N. L. Nelson, of Ames, Iowa. Considerable discussion was brought up under this topic, and it was voted that a committee should be appointed by the President to investigate the whole question of veterinary prices, and report at the next meeting. The following committee was named: Dr. J. N. Gould, of Worthington; Dr. C. A. Nelson, of Brainerd, and Dr. A. F. Lees, of Red Wing. In the evening, an address of welcome was given by Mr. J. N. Nicholson, and the response for the Association was made by Dr. Lees.

Following this, a special program on sheep and their diseases was given. Sheep raising was presented by Professor Philip A. Anderson, of the University of Minnesota, non-parasitic diseases by Dr. W. L. Boyd, and parasitic diseases of sheep (illustrated) by Dr. C. P. Fitch.

On Friday a report of the State Veterinary Examining Board was given by Mr. A. J. Tupa, Executive Secretary. This was followed by a most interesting discussion on the army veterinarian, by Captain J. H. Gould, who has just recently been graduated from the War College, Washington, D. C.

The last paper for the morning was given on "Control of Black-leg," by Dr. J. F. Shigley, of St. Paul. In the afternoon all the veterinarians were taken in automobiles to the packing house of George A. Hormel Co., where a display of various pathological specimens was arranged. Dr. W. L. Boyd demonstrated by means of specimens, the diagnosis of pregnancy in bovines, the various changes which occur during pregnancy, and the diseases of the genital tract.

Nineteen new members were admitted to membership.

C. P. FITCH, *Secretary*.

OKLAHOMA NOTES

The State Veterinary Association held its summer meeting at the Huckins Hotel, Oklahoma City, July 6 and 7.

The program was furnished by home talent, the principal subjects for discussion being ethics and tuberculosis control.

The officers elected for the coming year are:

C. H. Anthony, President.

J. E. Nance, Vice-President.

C. H. Hooker, Treasurer.

H. W. Ayres, Secretary.

The customary banquet was held at the Huckins Hotel with Dr. D. W. Gerber officiating as toastmaster.

In keeping with the times the annual dues were doubled.

Fifteen new members were initiated.

Dr. W. F. Taylor, formerly with the B. A. I., at Chicago, has been employed by the Western Weighing Association to supervise the loading of fresh meat cars at Oklahoma City. Special attention will be paid to the temperature of cars and coolers. This opens another field for veterinarians.

Dr. C. L. Nelson, formerly with the Extension Division of the

U. S. Department of Agriculture, has resigned and entered the service of the Oklahoma National Stock Yards Company as a field agent to stimulate the production of more and better livestock, especially sheep.

J. S. GROVE.

NEVADA STATE VETERINARY ASSOCIATION

The Nevada State Veterinary Association held its sixth meeting on July 5, 1920, in Reno, Nevada. The meeting consisted of a clinic in the forenoon at Dr. George E. Bamberger's hospital and a literary session in the evening at the Veterinary Department of the University of Nevada.

At the evening session Dr. W. E. Harrison, located at Fallon, Nevada, recounted his experiences with the veterinary corps of the American Expeditionary Forces in Siberia, and Dr. W. B. Earl read a paper on "The Classification, Preparation and Real Function of Veterinary Biologic Products."

The meeting was presided over by Dr. Robert Dill and was attended by half of the active members.

On the suggestion of the president, the meeting urged further investigation of the milk and meat situation in the city of Reno and the appointment of a committee to coöperate with the City Council in establishing a satisfactory system for the sanitary supervision of these products.

STEPHEN LOCKETT, *Acting Secretary.*

PRINCE EDWARD ISLAND ASSOCIATION

At a recent session of the Provincial Legislative Assembly, an Act to incorporate the Prince Edward Island Veterinary Medical Association, and investing in the Council of the organization the control of veterinary practice, was fully ratified.

In order to avoid the antagonism of rural members of Parliament, a provision was made to register all persons who were five years in active practice, whether they were graduates or empiric practitioners.

Some features of the act are, that no branch of veterinary science is excluded and that castration, vaccination and preventive public health veterinary work must in future be done by qualified men, and that all non-qualified practitioners must submit to examination before their names are placed on the register. The Examining

Board and Council appointed to administer the act include the following: Examining Board: Hon. Geo. E. Hughes, M.P.P.; J. A. Allen, V.S., B.V.S.C.; W. G. Church, V.S. Council: A. A. Leckie, M.R.C.V.S.; J. D. Cumming; W. G. Church, V.S.; K. W. MacKinnon, V.S.; R. Cameron, V.S.; I. E. Croken, V.S.; J. A. Allen, V.S., B.V.S.C.

K. W. MACKINNON, *Secretary*.

TUBERCULOSIS ERADICATION CONFERENCE

A conference of State and Federal employees and general practitioners engaged in tuberculosis eradication work in the New England States was held at Congress Square Hotel, Portland, Maine, July 13, 14, 15. The following program was carried out:

The Object of the Conference, by Dr. J. A. Kiernan.

Address by Hon. J. M. Whittlesey.

Discussion by Dr. W. H. Lynch, Mr. A. L. Felker, Dr. L. H. Howard, Mr. E. S. Brigham, and Mr. J. J. Dunn.

The Intradermic Tuberculin Test, by Dr. George E. Corwin.

Discussion by Dr. Charles L. Colton and Dr. F. E. Blake.

The Ophthalmic Tuberculin Test, by Dr. A. J. DeFossett.

Discussion by Dr. A. E. Bancroft, President Vermont Veterinary Medical Association, Dr. L. M. Adams and Dr. John W. Herman.

The Subcutaneous Tuberculin Test, by Dr. H. B. Leonard.

Discussion by Dr. Arthur L. Edmunds, Dr. W. A. Nannery and Dr. P. T. Keeley.

Combination Tuberculin Testing, by Dr. L. B. Ernest.

Discussion by Dr. Charles L. Colton and Dr. F. J. Bardsley.

Discussion regarding rendition of report of field work and indemnity claims, also discussion of regulations pertaining to tuberculosis eradication work, led by Dr. A. E. Wight of Washington, D. C.

The technique of various tuberculin tests was conducted at Portland Abattoir, by Drs. H. B. Leonard, A. J. DeFossett and G. E. Corwin. The conference attended the banquet and meeting of the Maine Veterinary Medical Association on the evening of the 14th.

Last year the conference was held in Chicago and was national in character, but it was thought that greater results at less expense and greater representation from each State could be had if this year the conference were sectional. It is a compliment to the State of Maine, which is deserved in view of the fact that her rank in the

nation in the tuberculosis eradication work is fourth. So praiseworthy has been her effort and advanced her work that the Bureau of Animal Industry has recently taken its representative, Dr. J. B. Reidy, from the immense areas of the largest State, Texas, and stationed him in Maine, which is obviously becoming a State wherein healthy cattle are coming to be the order of things.

Dr. J. A. Kiernan, chief of the Tuberculosis Eradication Division, opened the session with an address upon the subject of the conference. He said that tuberculosis was threatening the live-stock industry of this country, alarming the owners of purebred cattle because it was increasing at rate of one per cent a year. Therefore a campaign was decided upon and Congress asked for an appropriation to enable the work to be carried forward. In 1917 an appropriation of \$75,000 was granted for the control and eradication of the disease and in 1917 the Tuberculosis Eradication Division was formed.

Hon. J. M. Whittlesey was among the first speakers of the conference. He claimed that 20 per cent of the tuberculosis cases among children in Connecticut was due to infected milk, and in that statement lies the reason for the interest Connecticut takes in the eradication of tuberculosis among cattle. It is a matter of public health. This meeting was held in the sun parlor of the Congress Square Hotel and about 75 veterinarians from all the New England States were present, together with visitors from the State of New York and District of Columbia.

The idea of the conference is to assemble the workers of the different States together and to pool experiences, with the view of making the nation-wide work more efficient.

The particular aim of this conference was to decide if possible on the best of the three known tests for discovering tuberculosis among cattle. At such meetings nothing is kept under cover and the work goes forward at an enthusiastic and tireless rate, while men endeavor to demonstrate that scientific testing of herds is a means of stamping out tuberculosis.

In the discussion following the speech of Mr. Whittlesey, Mr. Felker suggested that all New England States have uniform laws regarding control of live-stock diseases within the borders.

The next speaker was Dr. Corwin, of Connecticut, and he addressed the assembly on the fine points of the intradermic test. He observed with gratitude the great interest in the work and went on to tell how his State was in the market for 5,000 head of dairy cattle annually and that until the past two or three years she was the dump-

ing ground for tuberculous cattle until the eradication work was fairly started. For some time the subcutaneous tuberculin test has been the only recognized one. Today there are three reliable tests, of which in the opinion of Dr. Corwin the intradermic test can be used with less complications. It can be used at any time, in any weather and place, and does not depend upon several phenomena. In the minds of many veterinarians it has a great future and is received with growing confidence and growing popularity. Dr. Corwin believes no herd can be called free of tuberculosis without passing this test.

Dr. A. J. DeFossett was the next speaker, with arguments in favor of the ophthalmic test, which is almost in exclusive use in Vermont and which always succeeded when the old subcutaneous method proved a failure. He claimed the same value for the ophthalmic tests as did the previous speaker for the intradermic, and that no herd can be called healthy until it has passed the ophthalmic test.

It was the duty of Dr. H. B. Leonard, of New York, to uphold the honor of the subcutaneous method, which was more or less disparaged. He declared that this method was the most reliable, while admitting that many incidents seem to show it had less favorable qualities, and caused much smiling when he said it was one of the accurate tests. Dr. L. B. Ernest, of Washington, D. C., was the advocate of all three methods, as none of them was absolutely efficient by itself. He declared that the combined test was necessary and that research has shown that this combined method has never missed a case.

An interesting discussion followed the close of the formal addresses and many individual experiences were offered. The large assembly convened to discuss these matters was commented upon and Dr. J. B. Reidy, who represents the Bureau of Animal Industry in Maine, said it was one of the most important meetings of the kind in the country. Speaking of the efforts of men to decrease the rate of tuberculosis, which was described as one of the greatest menaces to human life, he said they had begun to control it in its most vital agency, cattle.

The afternoon was passed with the Maine Veterinary Medical Association, with the President, Dr. W. H. Lynch, who is also Livestock Sanitary Commissioner of the State of Maine, in the chair.

There was a good deal of routine business, reception and disposal of reports.

The great social event of the second day of the conference was

the banquet at the Congress Square Hotel in the evening. There were many able speakers and much interest was paid their utterances. Dr. W. H. Lynch opened these addresses by speaking of the conference as one of the most instructive and important since their coöperation with the Bureau of Animal Industry. He said this additional work for the doctors increased their efficiency and experience and spoke with pleasure of the gradual elimination of the empiric, which makes for higher educational standards. With the contempt of the true veterinarian for automobiles, he told a story of a small boy who claimed that horses were superior, for "if you have horses, you can raise horses, but if you have automobiles, nothing will raise them but a jack."

The toastmaster for the evening, Dr. E. A. Crossman, of Boston, Mass., made a little speech on his own account, in which he told of the important work which had been done in tuberculosis eradication, saying it is the most important work ever undertaken by any nation. He introduced as the speaker on this topic the chief of the division, Dr. J. A. Kiernan, of Washington, D. C.

Dr. Kiernan spoke about the wonderful work of Dr. Corwin during the day and said that if his diagnosis and deductions proved as accurate in all cases, he was indeed the super-veterinarian. He said a good word for the old subcutaneous test which had been in use thirty years. Dr. Kiernan is a ripe scholar with attainments in other fields than veterinary science, as he easily demonstrated in his fine address, which showed a familiarity with many subjects. He was warmly applauded as he sat down.

The next speaker was Dr. F. Torrance, Veterinary Director General of Canada, and he told of the work being done in the veterinary college in Toronto. He spoke of the friendly feeling between Canada and the United States and spoke of the efforts to end the pernicious correspondence schools. His speech contained graceful felicitations upon the good feeling between the United States and Canada.

Before introducing the next speaker, Dr. H. L. Howard, who spoke for the ladies, Dr. Crossman talked very earnestly about the besetting sin of the veterinarian in being too modest in proclaiming his deeds and efficiency in promoting the health of the nation. He said the Panama Canal was an after effect of the Bureau's work in proving that a disease could be carried by insects. He said the veterinarians had controlled hog cholera and reduced scabies to

lessened proportions and told of the work they are doing along the borders of the country to prevent entrance of disease in livestock.

Dr. Howard was followed by Commissioner A. L. Felker, of New Hampshire, who proved to be the silver-tongued orator of the evening.

Hon. J. M. Whittlesey, of Connecticut; Dr. A. E. Wright, B. A. I.; Dr. DeFossett, of Vermont; Dr. Cook, of New Brunswick; Dr. Maloney, Fall River, Mass.; Dr. Smith, Hartford, Conn., and Dr. Reidy, B. A. I., all spoke briefly and in high terms of the benefits of the conference to the public at large, and stated that after fifty years of struggle the profession is at last being recognized as a factor in the life and health of the nation.

W. H. LYNCH, *President.*

P. R. BAIRD, *Secretary.*

Dr. S. F. Musselman, State Veterinarian of Kentucky, writing in advocacy of better breeding for live stock improvement, emphasizes the fact that females of the beef type should be bred to beef bulls, and that females of the dairy type, regardless of breed or class, should be bred to dairy bulls.

Recent experience is demonstrating that the mule will beat gasoline power. * * * In the Middle West and East it is being found that mules and horses are better for work in many places where it once seemed that the tractor would predominate.—*Breeder's Gazette.*

President Wilson has been enrolled in the "Better Sires—Better Stock" campaign. The sheep that graze the White House lawn are the President's personal property and make him eligible for participation in the nation-wide effort to improve live stock in the United States.

It is a great relief to horsemen everywhere to know that there is no longer any doubt about the draft horse coming back. There is not a single indication anywhere to lead farmers to think that maybe they ought not to breed their big mares this spring.—*Rural World.*

New England Farms, in an article on the progress of tuberculosis eradication work, says: "The eradication work is not only fundamentally sound but owners of herds may as well make up their minds that the time is coming when an untested herd won't stand a ghost of a show."

MISCELLANEOUS

INDUSTRIAL RESEARCH LABORATORIES IN AMERICA

A bulletin just issued by the National Research Council lists more than three hundred laboratories maintained by industrial concerns in America, in which fundamental scientific research is carried on. The bulletin gives a brief account of the personnel, special equipment and particular kind of research carried on in each of the laboratories listed.

Industrial research laboratories have increased notably in number and activity, both in America and Great Britain, since the beginning of the war, because of the lesson vividly taught by the war emergency. It was only by a swift development of scientific processes that the Allies and America were able to put themselves in a position first to withstand and then to win a victory over Germany's science-backed armies and submarines. And it is only by a similar and further development that America and the Allies can win over Germany in the economic war-after-the-war, now being silently but vigorously waged.

FILMS TO INTRODUCE UNITED STATES LIVE STOCK IN SOUTH AMERICA

Introduction of American breeds of live stock and poultry into South America, particularly Argentina, is to be aided by the use of motion picture films prepared for this purpose by the United States Department of Agriculture. The films also will show American methods of breeding live stock and handling it in its many phases from the farm to the home table.

The Argentine Government has shown special interest in the introduction of American methods of handling live stock. The Argentine Embassy at Washington has already purchased ten films on these subjects for educational use in its country. It has frequently had the Department's bulletins on agricultural questions translated into Spanish for distribution in Argentina.

The Buenos Aires and Pacific Railway has been another purchaser of films and still pictures for use along its system. Its representative in this country recently called at the Department in quest of films showing the swine industry in the United States. He was enthusiastic over the opportunity of almost immediate success if efforts were concentrated on the introduction of American swine into

Argentina. He proposed that a film be prepared by the Department showing the swine industry in the United States, which could be used along the routes of that railway system.

The Bureau of Animal Industry welcomed the suggestion, and preparations are being made for filming the various interesting phases of the subject. It is planned to show important swine-breeding farms, the work in the big Chicago packing houses, and the preparation of the product for the table. Pictures will be made of the various types of American hogs, and an effort will be made to give some idea of the vastness of the industry in this country.

SCRUB COWS IN SOCIETY

Mrs. Scrub Dairy Cow is about to break into the upper class of dairy society. Madam Scrub will parade with the blue-blooded aristocracy of the cattle world. The United States Department of Agriculture expects to exhibit a grade family consisting of a purebred sire, a scrub cow, and the grade offspring of this mating at the National Dairy Show to be held at Chicago in October, 1920. Some of the cattle clubs will also have similar exhibits.

The purpose of this feature is to interest the owners of scrub and low-grade herds and to show in a practical way the manner in which such a herd may be improved by the use of a purebred sire. This will do much to combat the prevailing idea that the National Dairy Show is of interest only to the owners of purebred herds. It will help also to advertise the fact that the United States Department of Agriculture, through its "better sires" campaign, is offering co-operation and aid to the owner of the poorest herd as well as to the owner of improved stock.

After all, Mrs. Scrub doesn't get into society on the strength of her own qualities; she is accepted purely on account of the merits of her mate and her progeny.

As we go to press, information is received to the effect that rinderpest has appeared in Belgium, but its exact location and degree of prevalence are not available as yet.

What is said to be the biggest steer in the world, measuring eighteen hands, and weighing 3,200 pounds, has been given to the Y. M. C. A. of Fort Worth after having been on exhibition at the Fat Stock Show at that place.—*Semi-Weekly Farm News*.

CONVENTION NOTES

Members of the A. V. M. A. came to the Columbus meeting in automobiles from as far west as the Mississippi River and as far east as Washington, D. C.

Des Moines was a formidable competitor and the only serious contender with Colorado Springs for next year's convention.

The constructive measures recommended by President Cary in his address and by the Committee on Intelligence and Education in its report were important features of the meeting.

A reunion of the World War Veterinarians of America was held at Columbus and Dr. L. A. Merillat was reelected president.

Among the older practitioners who attended the Columbus meeting were Drs. W. Horace Hoskins, W. G. Hollingworth, Otto Faust, Ben Pierce, S. Brenton, E. H. Shepard, William Herbert Lowe, David Cochran, W. Runge, A. S. Cooley and Nicholas Rectenwald. The early arrivals on Saturday found Dr. Faust already on hand. Dr. Rectenwald has been in active practice fifty-two years.

It was with deep feelings of regret that those of us who are accustomed to attend the A. V. M. A. meetings noted the absence of the late Drs. John F. Winchester and Joseph Hughes. Both were regular attendants and staunch supporters of the Association.

E. S. Bayard, editor of the *National Stockman and Farmer* and an honorary member of the A. V. M. A., delivered the most impressive and constructive address of the convention. His many helpful suggestions, given in a common-sense manner and illustrated by many humorous stories, will be read with profit by those who were unfortunate enough to be absent. At its conclusion a rising vote of appreciation was extended to Editor Bayard.

The National Association of Bureau of Animal Industry Veterinarians held its annual convention, as usual, in conjunction with the A. V. M. A. meeting. This was the third successful meeting of this association. Sixty delegates were present and important business matters were discussed.

The Ohio Clover Leaf Party for the ladies was held at the Deshler Hotel, with esthetic dancing, music and readings on the program. The recitations by Mrs. Fonsa A. Lambert of selections from the writings of Paul Lawrence Dunbar were very clever. Beautiful crystal prizes were awarded to the following ladies who were fortunate enough to hold cards bearing four-leaf clovers: Mrs. C. W. Sass, Mrs. Starnbaugh, Mrs. Aulger, Mrs. S. R. Craver, Mrs. T. E. Anderson and Mrs. A. T. Kinsley.

Eighty-three graduates of the Ontario Veterinary College attended the alumni banquet of that institution given at the Deshler Hotel on Tuesday evening. Steps were taken to provide a fund for the erection of a suitable memorial to the late Prof. Andrew Smith.

One of the many constructive actions taken at the Columbus convention was the inauguration of the Practitioners' Club of the A. V. M. A. with Dr. E. H. Shepard of Cleveland as chairman. The object of the club is to discuss and act on subjects pertaining to the welfare of the general practitioner. The annual meetings will be held on the first day of the national convention each year or at any other time deemed necessary by the chairman.

At its final meeting the Executive Board elected Dr. George Hilton of Ottawa, Canada, as its chairman, to succeed Dr. Charles H. Stange, whose term on the board expired.

Chairman Hilton of the Executive Board has appointed the following Sub-Committee on Journal: Drs. Kinsley, Bennett and Kiernan.

The fourth annual meeting of the Ladies' Auxiliary of the A. V. M. A. was held Monday, August 23, in Memorial Hall. A short but interesting program was presented, followed by the election of the following officers: President, Mrs. A. T. Kinsley, Kansas City, Mo.; First Vice-President, Mrs. D. S. White, Columbus, Ohio; Second Vice-President, Mrs. F. A. Lambert, Columbus, Ohio; Treasurer, Mrs. H. P. Hoskins, Bedford, Mich.; Recording Secretary, Mrs. A. J. Wilder, Akron, N. Y.; Corresponding Secretary, Mrs. Ashe Lockhart, Kansas City, Mo.



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